COAL AGE

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Brothers

By Berton Braley

Written expressly for Coal Age

When things seem peaceful-like and calm
The racial ructions rise,
The Polack mixes with the Greek
The Lithuanian tries
To beat his Russian brother up
And bung the Austrian's eyes.

There's trouble twixt the Dutch and French
And all their kith and kin,
The Irish battle with the Swedes
The Croatian with the Finn,
And all the mine and camp is filled
With Inter-racial din!

But when disaster strikes the mine
And women wail their woe,
When fire or gas or dynamite
Has dealt a deadly blow,
When there's a call for volunteers
To dare the Hell below,

THEN Russ and Hun and Celt and Gaul
Lay by their racial pride,
To rescue those who still may live,
And bring up those who died,
The foes in many a long fought feud
Work nobly side by side.

And when the hero list is made
Of those who dared the flame,
There will be men of every race
And every sort of name,
For Austrian, Bulgar, Finn or Russ,
Brave hearts are just the same!

Ideas and Suggestions

Stopping the Leaks

SYNOPSIS—You don't get good results from your automobile engine when there is a loss of compression. It means the cylinders are leaking. Your business is just like that. Every little leak takes that much power and profit out of your organization.

Carefully gathered figures were recently presented in an article in COAL AGE showing the average net earnings of all coal-mining concerns in the United States to be less than 5 per cent. No doubt many individual companies could present statements showing a much better return than this; but, on the other hand, entirely too many concerns are making showings not even as good as 5 per cent., year in and year out.

The advertisers in COAL AGE are continually pointing out to coal-mining men that it pays to be alert and alive to the opportunities for increased production and economy afforded by the use of modern and up-to-date equipment.

In almost any journal the mining man may pick up, "Scientific Management" and "Efficiency" are preached to him until he no doubt wonders whether some of the expert advisors really believe or know anything about what they preach.

I wonder if you coal-mine managers, superintendents and auditors who were surprised to learn that the average earnings of all coal-mine concerns is less than 5 per cent. net, stopped to think of how much the total of small leaks in your own company contributed to this result? Maybe you took it for granted that your corporation was not a contributor because your last annual statement was very good looking. If so, YOU are the very man these remarks are intended to reach.

PROFIT BY THE MISTAKES OF OTHERS

Managing a mining enterprise or running a coal mine is very much like running your own business. You have a lot of experience, hear and read a lot about the other fellows' troubles, and get a world of advice; however, out of it all you take only what you like and use it. As your attention is called to leaks disclosed in the other man's business, such as payroll losses, storehouse shortages and accumulations of excess and obsolete stock, you think, "Well, we're all right there," and let it go at that. It's easy to get advice, but so hard to take it. The man who is profiting by the mistakes of others is hard to find. Those who prove that they can are holding down good jobs. If you find one running loose, it will pay you to hire him.

Take your payroll; it is the largest single item of your operating expenses. Have you ever considered that you ought to safeguard your timekeeper and your payroll in every possible way? Do you let your timekeeper make up your roll and pay it, too? If you do, change your method as soon as you can. It's asking too much of a man who usually doesn't draw a princely salary anyway to do this kind of thing month in and month out. It resolves itself into a condition where the plan itself insistently urges a man to become dishonest with little fear of detection. It isn't fair to the man to permit such a condition to exist, to say nothing of the possible loss to your business.

THE REMEDY

Don't let a timekeeper pay his own roll. Have some one check his work thoroughly, and have still another man do the paying.

Let us look at your supply house. Are you keeping any kind of daily, weekly or monthly inventory of what you are carrying? Is your stock classified so you can have statements drawn off which will exhibit the amount of material of any class on hand, average used per month and number of months' supply on hand?

You don't want to carry two kinds of packing of the same size and grade, do you? Maybe you'll find you are. Your new master mechanic won't use the brand of packing your former master mechanic liked, so he has put in a good stock of his particular brand. The old kind may stay on the shelves and deteriorate or rot. *The remedy for this*: Standardize your packing, along with a lot of other material which can be standardized, and make the soliciting agents go direct to your purchasing department when they want to sell you stuff.

Remember, it costs good money to keep a storehouse full of mine spares, especially in this day of costly electrical equipment. Excess stock will soon tie up a sum of money, the interest on which will pay the manager or superintendent who has learned how to avoid this—the kind of man who knows how to profit by the other fellow's mistakes.

APPOINT AN INVESTIGATING COMMITTEE.

Think it over, and don't dismiss this idea of getting after the small leaks until you have at least formulated a plan for discovering whether they exist in your business. *How can you do it?* One good way would be to appoint a standing committee of members of your departments, your storehouse keeper included. Frequent visits to the storehouse by a committee like this will bring to light stock that is in excess of requirements or apparently obsolete. The same committee may canvass other features successfully, such as the study of production figures, etc. Quarterly or semi-annual inventories of machinery and material inside the mine will also bring to light many items that may be used in such a way as to accomplish a real money saving.

[*This is an important subject. Cannot some of the* COAL AGE *readers tell us how they have stopped leaks in their own companies?—ED.*]

The gallery at the Rotherham rescue station in Yorkshire is so arranged that two teams may be at work at once, while the instructors, through a glass partition and door, can see exactly everything that is happening and ventilate at once in case of necessity; the equipment includes a powerful exhaust fan driven by electricity.

Applying the Methods of Scientific Management to Coal Mining

By H. Alexander Dean*

SYNOPSIS—There is no reason why scientific management, which has accomplished much in industrial works and processes, should not be applied with equal benefit to coal mining. An outline is here given of how this application might be made.

In an article entitled, "Does Bituminous Mining Pay?" published in Coal Age for Sept. 20, 1913, and reprinted in the *Electric Journal* for November, 1913, which attracted much attention and favorable comment at the time, A. E. Rickards, general manager of the Industrial Engineering Co., of Pittsburgh, said in part:

> To make a profit with the low selling price and the continual increase in the cost to produce coal is indeed a problem. One solution is to increase the output.
>
> Mr. Edward W. Parker states that "the present bituminous mines of the United States are capable of producing 600 millions to 700 millions of tons per year without opening another new working." To do this, of course, requires ample transportation facilities and plentiful labor supply.
>
> . . . From the foregoing it is seen that the capital account has reached such proportions that the future profits must be obtained through greater output and greater economies in the operation of the workings, and the investment must be kept down to a minimum.

The above quoted article is a lucid and powerful argument for the reduction of operating costs by the use of central-station electric power for all requirements about the workings.

The same reasoning and the same statistics, so far as they show a decreasing margin between cost of production and selling price of the product, are equally potent as arguments for the application of the principles of scientific management, which have been so successful in realizing economies in a great variety of manufacturing industries, to the mining of coal.

It is my purpose to sketch briefly a few of the most obvious practical applications of some of these well known principles to the operations in and about coal mines.

The latest available statistics of the coal-mining industry (those of 1912), give a total production of bituminous coal of 450,000,000 tons, with a total production cost per ton as follows:

Direct labor per ton	$0.5425
Indirect labor (day work)	0.2383
Salaries	0.0575
Supplies	0.1305
Royalties	0.0320
Miscellaneous expenses	0.0530
Total per ton	$1.0538

Assuming that as claimed by competent authorities, the output from the same workings might have been 600,000,000 tons, an increase of 33⅓ per cent., with little advance in the expenditures, let us see how this increase in output would affect the production cost per ton.

Direct labor and royalties probably would remain about as before, but the other expense items would show a reduction due to the increased output about as follows:

Direct labor per ton	$0.5425
Indirect labor (day work)	0.1790
Salaries	0.0432
Supplies	0.0978
Royalties	0.0320
Miscellaneous expenses	0.0400
Total per ton	$0.9345

This shows a decrease in production cost per ton of $0.1193, or 11.4 per cent., due simply to increase of tonnage produced.

The question is immediately asked by the practical mine manager as to the possibilities of getting out such an increased tonnage without large increases in operating expense.

The answer to this question in regard to the increased production of coal is the same as that given to plant managers regarding increased production of castings from a foundry or finished parts from a machine shop, viz.: *competent counsel.*

The practical mine manager is doubtless an expert as regards methods of cutting coal, getting it out of the mine and marketing the product. But counsel is necessary regarding the economical handling of labor; the planning in advance of work so as to avoid delays which invariably mean added expense; the setting, so far as possible, of standard tasks, and the payment of extra inducements to the workers for attaining these standards. The *square deal* on the part of the management toward the workers is essential that there may be harmonious coöperation instead of discontent, insubordination and distrust.

Production Must Not Be Interrupted

The mine must go on producing coal while these various innovations in the management methods are being worked out, and in order to save time and expensive mistakes in starting the work, a competent efficiency engineer should be employed to take charge of the new work and organize a production department, which will, in time, become a permanent part of the organization.

It is a fact verified by reliable investigators in thousands of observations, that the manual laborer seldom, if ever, delivers over 60 per cent. of the output of work of which he is reasonably capable, unless some special provision is made by the management for rewarding him for the extra effort and for avoiding delays in the continuity of his work.

Hence arises the necessity for a production department, which shall plan the work for each man or gang, standardize as far as possible the tasks to be performed, record the individual performance of workmen under these standards, and see that the workers receive a proper share of the benefits that accrue from the increased production.

In the first place production is kept far below the possible maximum by the lack of advance planning of the work in the mine. Each day a plan sheet should be prepared covering the proposed operations in the mine for the succeeding day, which plan sheet should show the number and location of each working chamber or room with the name or check number of the miner working therein, and the allotment of cars for that day.

In a large mine the workings may be divided into sections of a convenient size, and a plan sheet made out for each section.

A service card containing the above information should be issued to each miner as he enters the mine and stamped with the time of starting work. This should be taken up when the miner comes out, the clerk stamping on the card the quitting time and entering the number of cars reported as loaded by the miner, as a check on the reports from the tipple.

After the plan sheet is made out, the next item in im-

*Sewickley, Penn.

portance is a cutting schedule for the machine men, which should be arranged by the pit boss in such a manner as to be most economical of time in the movement of the cutting machines from room to room.

The next point in order is the preparation of a car-delivery schedule, which should be worked out in detail so that each working room receives its proper quota of cars as needed, taking into account the operations of the machine-cutting gangs, for it is obvious that no cars will be needed at a room during the hour that the cutting gang is working there.

This schedule distribution of cars should be handled by a car dispatcher, located where the trips of empties are made up, and he should have before him constantly a dispatching sheet, on which to note down the cars sent in to each room and the number of loaded cars brought out by the haulage men. The haulage crews should receive from the dispatcher instructions as to the disposition of each trip of empties taken in.

This plan properly worked out as to details will give the maximum use of the available cars in the mine insuring that the miners in the working chambers are supplied with cars at regular intervals and in sufficient number, and above all it should provide a constant and ample stream of loaded cars at the foot of the hoist, or at the dump, so that alternating periods of congestion and idleness will be avoided.

The car dispatcher's tally sheet should record all the trips of the haulage crews, showing time started, number of empty cars taken in, with their destination, time returned, number of loaded cars brought out, elapsed time for the trip, and causes for any delays.

A constant check on the work of the haulage crews with the necessity for adequate explanation of all delays will work wonders in securing promptness and continuity of service in this all-important division of the work.

A thorough study of the work of the cutting-machine gangs will soon enable the production supervisor to standardize their operations and offer a bonus inducement for saving time, particularly in moving from room to room and in setting up their machines, thus securing a greater output from these productive units.

The method so far outlined will, if developed and applied with care and judgment, result in large increases in the output of the workers, who are primarily responsible for the amount of coal produced, and the same careful study devoted to the use of the nonproductive labor about the workings will reveal many opportunities for savings.

All material and supplies should be kept in the charge of a storekeeper and issued only on requisition signed by a responsible authority, and stating the use for which the supplies are drawn and the account to which they are to be charged.

In order that the mine manager may at all times keep in close touch with the production costs in his mine, he should receive, at least once a week, a statement from the cost department, showing the following details of operation:

(1) Number cars coal hoisted.
(2) Number cars slate hoisted.
(3) Tons of coal shipped.
(4) Mining labor per ton.
(5) Inside nonproductive labor per ton.
(6) Tipple labor per ton.
(7) Repair labor per ton.
(8) Power-plant charges per ton.
(9) Supervision and office per ton.
(10) Materials and supplies per ton.

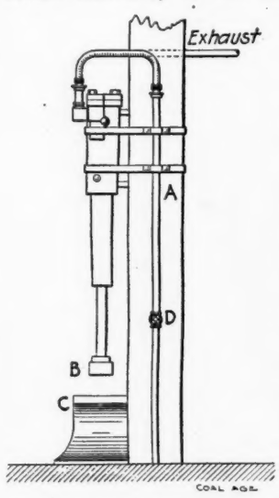
The manager should himself plot these results on graphic charts, so that the relation of these items in his cost of production are brought sharply to his attention and any undue rise in any item may be immediately investigated and the cause remedied.

The practical working out of the system, as outlined above, will not require the addition to the payroll of a large number of nonproductive clerks or timekeepers, or the introduction of large quantities of useless red-tape, but, on the contrary, can probably be worked out by utilizing men already on the payroll, simply by changing the character of the work they are doing, under the direction of a competent efficiency engineer.

A Novel Steam Hammer

One of the important elements that enter into the successful operation of a coal mine is the ability to utilize material that has outlived its usefulness in the place or for the work it was originally designed to accomplish.

An example of this recently occurred at our mine, in the adaptation of a discarded coal puncher for use as a steam hammer, in the blacksmith shop. A large coal-punching machine, which was no longer needed in the mine, was taken into the shop on the surface, where it was strapped and bolted to an upright beam or pillar *A*, as shown in the accompanying sketch. A tool-steel hammer head *B* was fitted to the end of the cutter shaft and an anvil *C* placed underneath this to receive the blows.



COAL PUNCHER USED AS A STEAM HAMMER

This improvised steam hammer was found to be very powerful and proved the means of saving much time and labor. The hammer is operated by steam from the boiler house and its action controlled by the small globe valve *D*. I thought that this item might be of interest to some coal operator who may find it of advantage to make similar use of a discarded machine.

BY THE WAY

Saving is a greater art than gaining.

It is better to do well than to say well.

The way to be safe is never to feel secure.

The man that parleys has half surrendered.

It's foolish to try and fly like an eagle with the wings of a wren.

He who has lost his reputation, is a dead man among the living.

It's unfortunate when a man's palate has quicker sensations than his heart.

Prosperity tries the human heart with the deepest probe and brings forth the hidden character.

Coking Possibilities from Different Viewpoints

By H. S. Geismer*

SYNOPSIS—Notes on the methods, troubles, misunderstandings and squabbles of those who furnish the coal, those who make the coke and those who employ it in metallurgical processes.

The man in charge of a coking operation can appreciate the expression "between the Devil and the deep blue sea."

Between the blast-furnace manager who is calling for better and cheaper coke and the coal-mine manager, who is always calling for better weights and less rigid inspection, he finds his time well occupied. Even where one operating company has charge of the mines, ovens and furnaces, disputes are not entirely eliminated, but, under such circumstances, it is at least possible to arrive at the most economical basis for the combined operation.

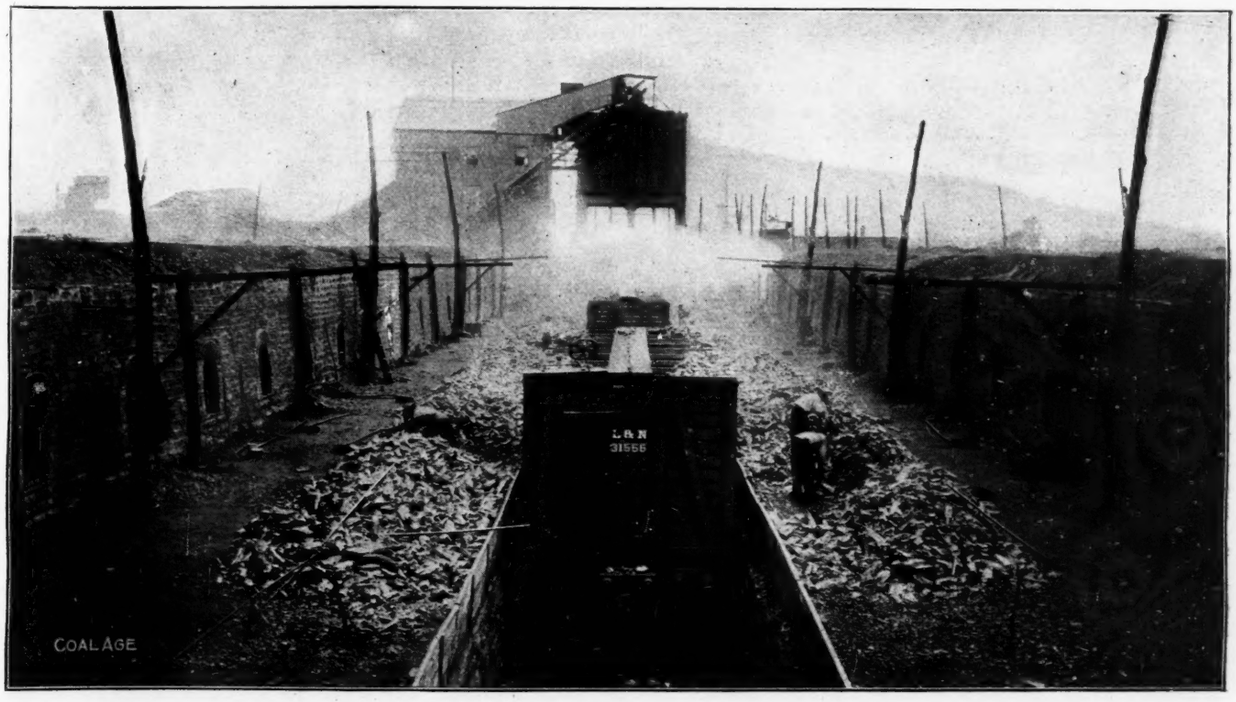
To intelligently criticize the results obtained from any coking operation, three tabulations are required: "A," cost; "B," yield; "C," quality.

In what follows when we refer to cost, we mean total cost of coke, including that of the coal used: by yield, we signify yield of coke expresed as a percentage of coal charged.

In judging a coking operation, three different interests must be considered:

1. The blast-furnace man who uses the coke; he is principally concerned with quality.
2. The plant manager, who has charge of manufacturing the coke; he is principally concerned with cost. His cost, however, is largely a question of yield.
3. The coal-mine manager, who furnishes the coal to the ovens; he is principally concerned with the yield since his tipple weights are largely judged by tons of coke produced, especially when there is no chance to check coal weights as charged to ovens. As a matter of course, the quality of coke depends largely upon the quality of the coal furnished, but the mine manager dodges that issue whenever possible.

As most coke complaints originate at the furnace, we will consider the furnace-man's troubles first:



An Alabama Coking Operation

At a certain furnace plant, a coke was tried that, according to analysis, should have given fairly good results, but it was noticed that whenever the admixture of this fuel in the furnace exceeded 50 per cent. of the coke charge, the furnace began to "stick." The manager suggested that in some way, this coke was evidently running up the percentage of alumina in the burden. An analysis of the ash in the coke was then made and the percentage of alumina was found to be extremely high.

Since the alumina in a coke can only be introduced through ash in the coal, an investigation was begun at the mine and it was found that the coal was not being properly prepared. Much slate was being loaded by the miners and the washer was not giving a good product. After correcting these evils, the coke produced gave satisfactory results in the furnace.

At another time, at this same furnace, the coke con-

*Birmingham, Ala.

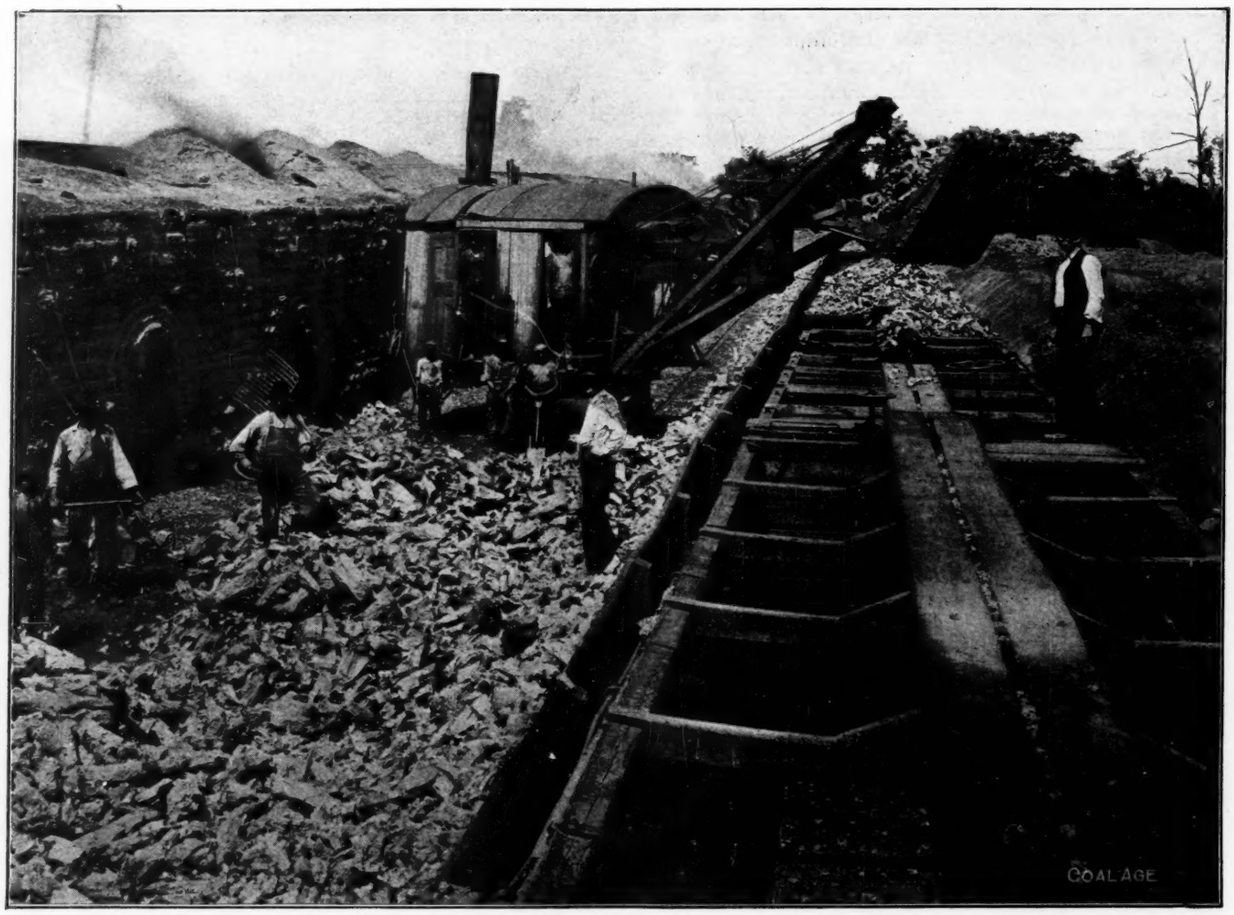
sumption (pounds of coke required per pound of pig iron produced) began to climb, and careful examination of this fuel, as it was being unloaded from the railroad cars, indicated that it contained a large percentage of spongy ends and jamb coke, as well as too much breeze and pieces of firebrick. Such irregularities are supposed to originate only at the ovens and the investigation was continued to that point of the company's property. Strange to say, most of the blame was not chargeable in this case to the coke-oven superintendent.

Too Much Rash Made Spongy Coke

It was found that the coal, as charged to the ovens, contained a large amount of rash and "mother coal," and with the quality of the coke, the company auditor began to ask curious questions about the cost thereof.

High cost of coke may be chargeable to several different conditions, but generally, low yield is the governing factor.

Charles Catlett contributed an excellent paper to the American Institute of Mining Engineers, at the New Haven meeting, in October, 1902, which covers the question of yield very fully, and Newell G. Alford, in his paper in Coal Age, of June 7, 1913, also brings out several points bearing on this phase of coke making, but in this particular instance, the high cost was simply a book-keeper's cost. It was found, after careful investigation, that the ovens were being charged with very wet



Loading Coke Into Cars with Automatic Shovel

these impurities did not unite with the rest of the charge to form a firm coke, but produced instead spongy masses that were easily broken up into small pieces of breeze. These inferior masses of coke were very noticeable around the door jambs of the ovens. The mine superintendent tried to lay the blame on his washer man, but it was found that the washer would not eliminate a large percentage of the impurities.

Rules were then adopted, putting it up to the mines to leave these impurities underground. Of course, it is not possible to depend upon miners to load absolutely clean coal, but enough improvement was accomplished to make a marked difference in the quality of the coke.

After the blast-furnace management became satisfied coal (13 per cent.), while only 4 per cent. was being allowed for moisture content. This shifting of the figures did not help the final cost of coke, as chargeable to the furnace, but it put the blame where it belonged.

Occasionally differences arise between the coke-oven and the blast-furnace men, as to what constitutes best practice. For instance; some furnace men prefer 72-hr. coke, while others prefer 48-hr. Now it is quite possible that while the furnace man prefers the 72-hr. coke, the superintendent of the ovens might find it more economical to produce 48-hr. coke.

Again, the blast-furnace man will always contend for the lowest possible limit to ash in coke, because every per cent. of ash that he succeeds in eliminating from the

fuel, cuts down his cost on pig iron approximately 25c. per ton. But it is possible to overdo this. Sometimes it is better to leave a little more ash in the washed coal rather than introduce an undue waste, in an effort to obtain too low an ash in the washed product.

When one company controls the mines, ovens and furnace, it is easy to arrive at the most economical basis for the handling of the combined operation, and it is then simply a question of "laying down the law" to the various operating heads, but, under different conditions there will always be more or less wrangling. All parties cannot be satisfied.

From the standpoint of the coking superintendent, the question of uniform operations and output is of supreme importance, yet he can get little sympathy from the blast-furnace man in this matter. When the blast furnace begins to "act up," and refuses to take its burden, it is much easier to stop the supply of raw material at its source than to begin work on the stock piles and the coke-oven men receive orders over night to bank ovens.

This constant banking and starting adds a considerable amount to the cost sheets of many coking operators, besides affecting quality by increasing ash in the product. At times the delays call for more than "banking," and in that case the expense of firing up the ovens brings about even more serious additions to the cost sheet.

Rules for Good Results in Firing Up

There are several different methods of firing up ovens. The following instructions, written out a number of years ago, have always been found to give good results:

Preparation—Have all wood and kindling in place on yard. Begin at midnight to put fire in the ovens.

Method—Put up half door, leave hole in bottom about 6 in. square. Put in two ties as a sort of flue, extending on the bottom of the oven toward trunnel head. Build fire opposite hole in door and between ties, using plenty of kindling, enough to fire coke. Use plenty of coke, a cart-load or two (black jack will answer), placing just inside of door, on top of kindling.

When coke is well caught up, which may take four or five hours, charge with 5½ tons of coal. Level this and then put in all the old ties or other wood you can get in at the door. Put up the door, sealing it tight where you usually draft, but leave two holes level with the top of coal in the ovens. This will give a draft at bottom for the kindling and coke and a draft higher up for the ties after ignition. There should be a competent man to keep these holes cleared out as ashes form.

When the coal has fired as it should and it is considered safe to do so, seal the three holes and draft at top of door, only the latter must be much lighter than usually given to ovens in service. Someone used to drafting and with some judgment is needed here. Many of these ovens, nearly all of them, will burn in all right, giving no more trouble and making good coke, but some will need the crust broken and other attention. We usually blame this on the man looking after the ovens, but the truth is that some ovens will do well and others the reverse.

Even Loading May Become a Bone of Contention

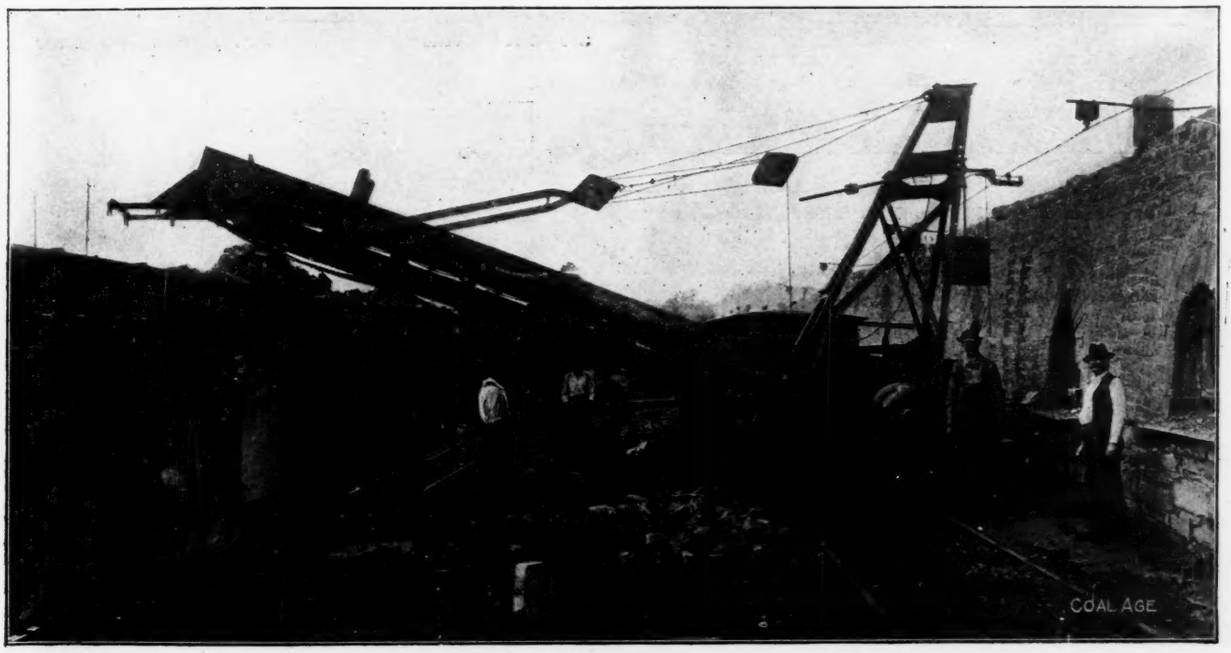
Determining the best method for loading coke from beehive ovens presents another problem for the coke-oven superintendent and in this he again comes in conflict with the blast-furnace manager.

There are two things to be considered—labor and waste.

The four photographs show four different ways of accomplishing this work. The old original method of hand forking and throwing each forkful up over the side of the car, probably yields the best results considered from the viewpoint of the blast-furnace man, as it gives him clean coke almost free from breeze.

But this method is far from satisfactory to the coke-oven operator. It introduces an acute labor problem since it is becoming more difficult each year to keep a complement of coke pullers, and furthermore the waste of fine coke with the breeze is always noticeable.

The photograph showing the runway suggests a method that overcomes, to an extent, the shortage of labor, as one good coke puller can use two ordinary laborers to wheel up the coke and thus accomplish as much as three trained men. This method also reduces the loss of fine material



A Modern Coke-Loading Machine at an Alabama Plant

and breeze, as the coke can be dragged directly from the oven door into the iron wheelbarrow, thus avoiding one handling. Here again the blast-furnace manager will register a kick if the men are not closely watched to prevent ashes and breeze being loaded.

One runway will serve seven ovens. The top of platform is so arranged that the wheelbarrow will dump over the top of car sides without an effort on the part of the laborer.

This brings us to a consideration of the third party—the coal-mine superintendent.

A RUNWAY CAN BE MADE TO SERVE SEVEN OVENS. THIS EFFECTS A CONSIDERABLE SAVING IN LABOR

As a rule, the coal-mine superintendent gets little credit for improvement in coke, and yet the quality is almost entirely dependent upon his product. The only possible way to keep peace between the coal man and the coke man, is to eliminate all guesswork in computing their weights and then base price entirely upon quality of coal delivered.

Where one company operates both the ovens and the mines, the mine official should be given his share of the credit whenever quality of coke is improved.

The Ohio Labor Situation

Nothing has been accomplished towards negotiating a wage scale for Ohio mines. Conferences between operators and miners started June 23 and lasted for the greater part of last week. After failing to reach an agreement, operators from Eastern Ohio and Cambridge withdrew, saying that it was useless to confer longer. The best that the eastern operators would offer was 41.12c., and this the miners refused point-blank to accept.

After their withdrawal, operators and miners of the Hocking Valley, Jackson, Crooksville, Pomeroy Bend and a part of the Bergholz districts resumed negotiations. The operators, after a general meeting, offered a scale of 44.61c. for machine-mined coal on the mine-run basis. This was made in the form of an ultimatum and was refused by the miners. The final conference for the week was held June 27, and an adjournment *sine die* was taken.

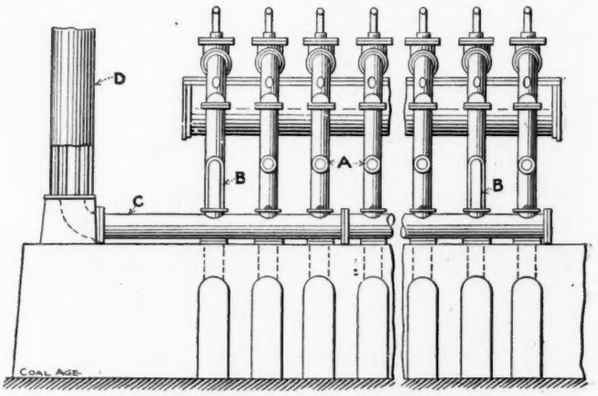
Senator William Green, author of the mine-run law, hearing of the adjournment, rushed to the meeting and succeeded in having that action rescinded and an adjournment until 10 a.m. June 30 was taken.

Operators in every section of the state have little hopes for an early adjustment of the wage question. The miners' officials have a firm hold on the rank and file, and, despite certain dissatisfaction, are holding them in line. It will probably be necessary to have another general miners' meeting before a less scale than 49.64c. will be accepted by the miners.

Device for Rendering Coke Oven Gases Harmless*

At the Colonial shaft of the Mansfield mine in Langendreer, Germany, experiments have been made with a process for rendering harmless the vapors and gases escaping from byproduct coke ovens when they are charged. Since the results of the trials have been good in every respect, the works management has arranged for the installation of this device for a group of fifty ovens.

As shown by the accompanying figure, the riser pipes are each provided with a branch, *A*, which, whenever the



SKETCH OF THE WASTE-GAS CONSUMER

several chambers are to be charged, is put in communication, through a sheet-metal bend *B*, with the horizontal conduit *C* over the ovens. This conduit ends in a furnace *D*, about 30 ft. high, in which the vapors and gases, as they pass through, inflame and are consumed. The draft caused by the high temperature is so strong that gases are sucked in from a distance of about 170 feet.

Electrification of the Bearcreek Coal Field in Montana—One of the most important new deals just consummated is the entry of the Montana Power Co. into the Bearcreek coal field in the southeastern part of the state, to supply the mines and towns with electric power and light. This is one of the leading coal fields in Montana. The coal mines at Sand Coulee and Stockett, a few miles from Great Falls, have for some time found it cheaper to buy hydro-electric power than to utilize their own boilers and coal for steam, but the Bearcreek district is the first instance in the history of the world where electric power has been shipped any considerable distance to supplant steam power at coal mines themselves. The Bearcreek field is being reached from Billings by a 60-mile line, which will tap Joliet, Fromberg, Bridge and Bearcreek. The power will come chiefly from the new Great Falls plant, some 300 miles distant. It is expected that 4000 to 5000 hp. will be consumed in the Bearcreek district by 1915, netting the Montana Power Co. approximately $100,000 per year.—"Boston News Bureau."

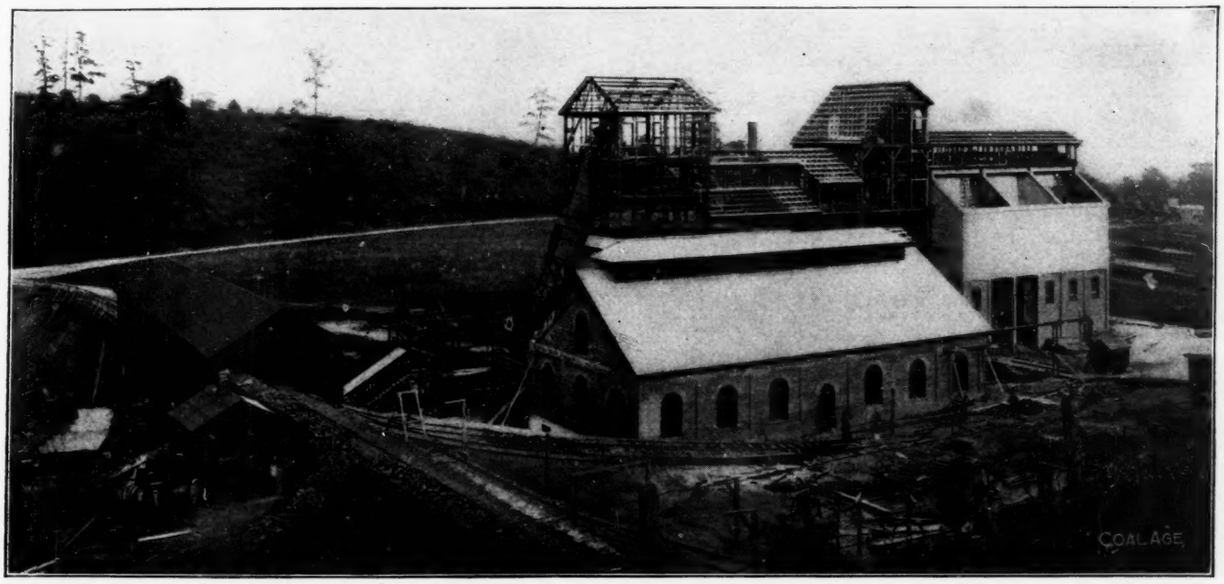
*Translated from "Glückauf."

The Huron Plant of The Keystone Coal Company

By Edward Colston Taylor*

SYNOPSIS—The efficiency of the Huron washery plant is exhibited in the excellence of its washing, in the small number of men employed, in its freedom from breakdowns and the speed with which such difficulties are corrected. In regard to the former, which the author does not treat, it said that less than 4 per cent. of what should be re-wash coal, as determined by the float-and-sink test, finds its way to the refuse pile. Three men run the washer and rewashers which handle 150 tons of coal per hour and 13 men operate 100 Belgian ovens. Three men take care of the boiler house, the ashes being removed by flushing with water.

The Huron plant of the Keystone Coal & Coke Co. is situated on the Alexandria Branch of the Pennsylvania R.R. The shipping point is Dundale, and the post office New Alexandria, Penn.



View of Plant as Seen from Above the Drift Mouth

The coal seam is the Pittsburgh, with an average height of 7 ft. 2 in. This is a good steam coal and burns into excellent coke.

The washery and coking plant were put into operation in 1910 and have been in continuous service ever since; the coke commanding a ready market even in dull times. Beside furnishing washed coal for the ovens, the washery prepares fuel which is shipped for use in byproduct ovens and for smithing purposes.

The original mine opening was made in 1899 by the Huron Coal Co., which built the present tipple and dwelling houses, but shipped only run-of-mine coal. In 1907 the Keystone Coal & Coke Co. acquired the property and immediately began to plan for the erection of a washery and coke ovens.

*Superintendent, Keystone Coal & Coke Co., New Alexandria, Penn.

Two Plants with a Single Supply House

The workings and plant being adjacent to the Salem mine of the same company, the two plants were put under the same management, so that full advantage could be taken of the experience gained at Salem in washing and coking this coal and in the handling of such equipment as the management intended to use at both operations. Salem being equipped with a complete machine shop and an efficient supply warehouse and storage yard, there was no necessity of duplicating this equipment at the proposed workings. The same office force by the addition of one man handles the mine records for the two places.

From the autumn of 1907 until the autumn of 1909 nothing in the way of construction was attempted. During this time the management gave close attention to the operation of the Salem plant with a view of determining any changes which might be desirable in designing the new plant, in visiting other plants in this and other fields and in working out tentative plans. The information thus acquired was of inestimable value in working out the design.

It was the desire of the management if possible to produce a plant which would be a model of efficiency and at the same time which embodied no radical departures from conservative engineering. They desired to depend on the careful working out of details along well established lines.

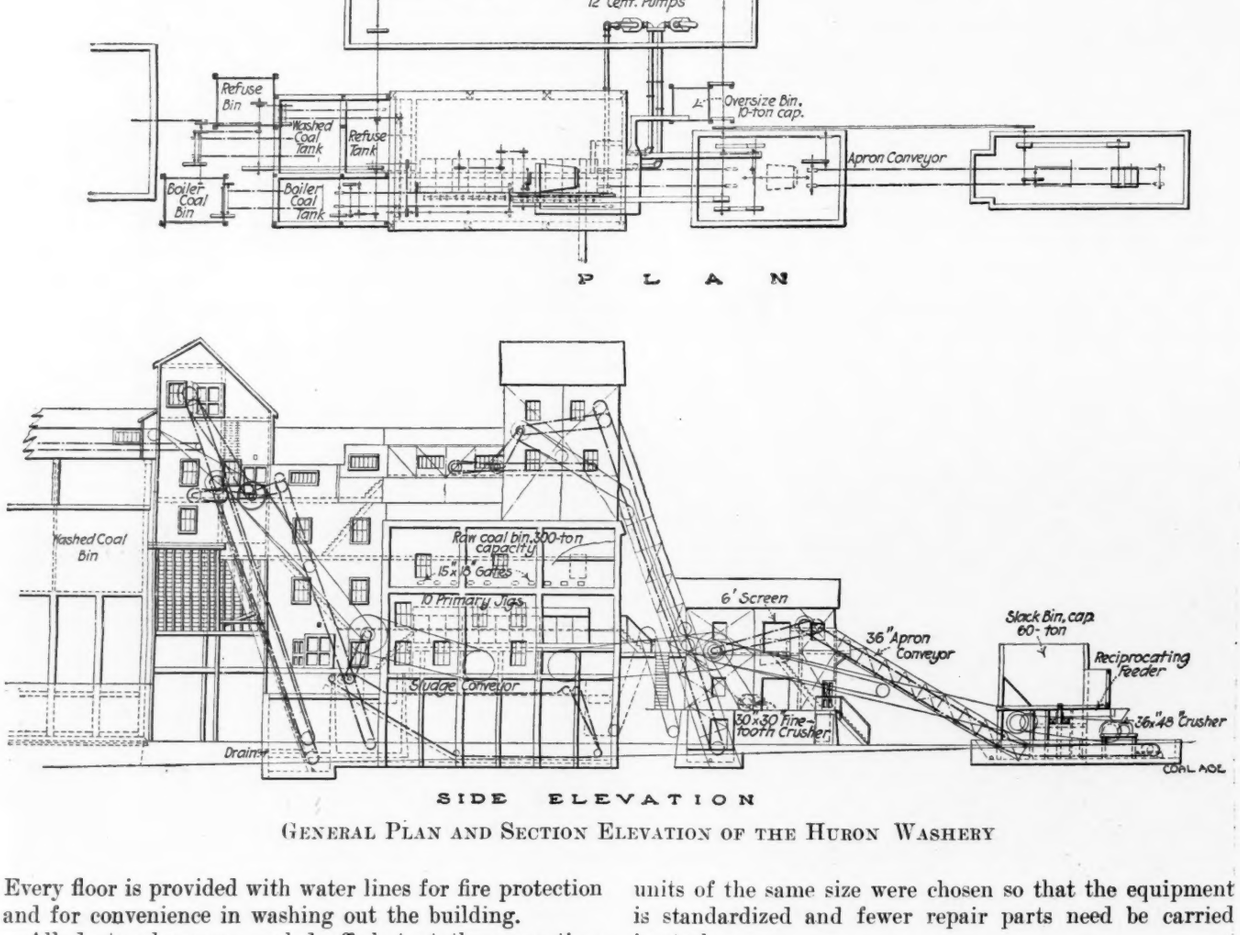
Eliminating and Anticipating Breakdowns

All buildings are well lighted and ventilated. Especial attention was paid to insure the accessibility of all machinery for repairs and to insure the comfort and convenience of all workmen. All machinery was designed

just large enough to insure the longest possible life in performing a given amount of work.

In the washery, stairs of easy slope are provided and safe-guarded by substantial railings. Windows are so arranged that there are no dark corners in the whole structure. The building is heated throughout with steam.

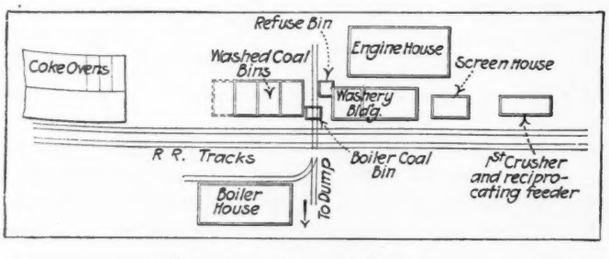
All the heavier machinery is provided with special breaking pins which are easily replaced and thus many disastrous wrecks are avoided. All elevating and conveying machinery is large and heavy, so as to be slow moving for a given capacity. Where any two or more like pieces of machinery were required of nearly equal capacity,



General Plan and Section Elevation of the Huron Washery

Every floor is provided with water lines for fire protection and for convenience in washing out the building.

All dusty places are sealed off, but at the same time left light and roomy so that in case of making repairs there are no casings to tear out nor close places in which to work. Around the heads of all elevators ample space is provided, the flooring around these places being sufficiently heavy to bear the weight of any repair parts. Care is also taken to provide ample light in such places and beams are projected from the building above every part which may need replacing, so that the heaviest machinery may be lowered, and repair parts hoisted into place in a few minutes.



General Plan of Plant

units of the same size were chosen so that the equipment is standardized and fewer repair parts need be carried in stock.

A Three-Man Washery Plant

The benefit derived from this careful and generous design has been marked. The washery easily has a capacity of 150 tons per hour. The washery proper is operated by two men, one man on the jigs and one man for oiling and general inspection of machinery. The only other man connected with the direct operation of the washery is under the tipple; he attends to the crushing and screening plant.

Although a complete stock of repair parts is provided, few replacements have been necessary. The machinery was furnished and the washery erected by the Link-Belt Co.

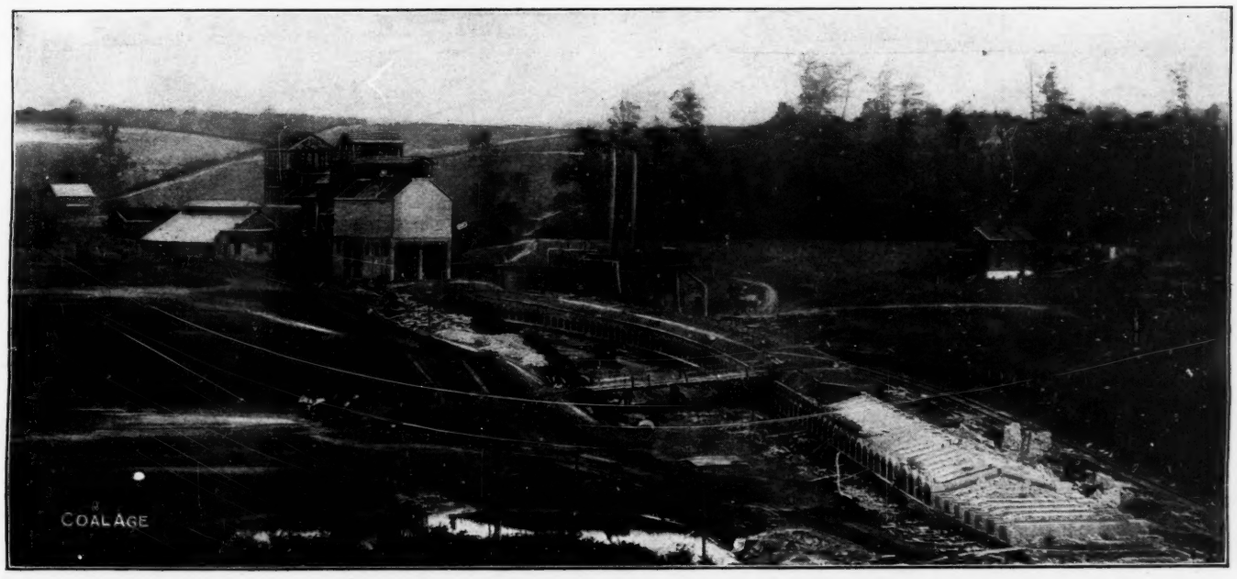
The raw coal is crushed so that the largest size passes through 1¼-in. round perforations. It is then elevated to a 300-ton capacity reinforced-concrete storage bin, which is a part of the washery building. From this bin the coal is fed into a battery of 10 jigs by means of revolving feeders. The washed coal is sluiced into a large elevator boot. The water from this boot is drawn off in a

thin stream, every effort being made to insure settling. Though 150 tons of coal per hour is taken out of this boot, 12,000 gal. of water are drawn off in the same time with the loss of only such material as will pass through a 60-mesh screen.

The Inferior Coal Is Saved for the Boilers

The primary refuse, consisting of 10 per cent. of the product, is sluiced to two rewashing jigs, which take out about half of the material for plant fuel and throw one-half into the final refuse elevator boot. The water from the boots of the elevators which lift refuse and washed coal, respectively, is sluiced into a large settling tank provided with a slowly moving scraper, which recovers the sludge below 60-mesh and places it in an elevator boot, where it is mixed with the best product from the rewashing jigs, and thence is elevated and sent to the boiler house for fuel.

The water is circulated by means of a centrifugal pump furnished by the Blackall & Baldwin Co. This pump is set in the cellar of the main engine house. The washed coal is stored in reinforced-concrete bins divided into six compartments, each of 200 tons capacity. Thence it can be run into the charging larry for the ovens or direct into railroad cars for shipment.



The Huron Power House, Washery, Boiler House and Coke Ovens in Process of Construction. The Tipple Is Seen on Left in the Rear

Almost Entirely of Fireproof Construction

In the construction of the washery building, various materials were used to meet each special condition. In the dry coal or preparatory end, structural steel was used set on heavy concrete foundations, this being advisable on account of the rapidly moving machinery. In the central portion of the building, where are located the settling tanks of concrete and the jigs and the raw-coal storage bin, reinforced concrete was used.

The wet-coal elevator towers are of yellow pine and made a part of the main building. The reinforced concrete was erected by the Baltimore-Ferro Concrete Co. The structural steel and frame part of the building is covered with Asbestos Protected Metal, as is also the roof.

The original tipple was left standing unchanged except for the additional bins and the crushing and conveying machinery for handling the washery coal. It is of frame construction, equipped with a Phillips cross-over dump. The mine cars which hold 1½ tons are fed to the dump by gravity and the empties run away in the same manner.

The coal is hauled outside by one 15-ton and one 10-ton General Electric locomotive. Six men and boys man the tipple.

Boiler-House Economies and Appliances

The boiler house is of brick with steel roof trusses, the roof covering being asbestos protected metal. The equipment of the boiler house consists of two 300-hp., class E Stirling boilers, equipped with McClave shaker grates and Argand blowers. The boiler house is set in a hollow across the railroad tracks from the other buildings of the plant. This was done so that the fuel could be delivered in mine cars or in special dump cars from the washer at sufficient height to allow of ample storage and so that the wet washery fuel may have steep slopes to slide on.

Advantage was taken of a small stream in the hollow, the water from which is passed under the boilers. Aided by some fresh water it flushes the ashes away without handling. The feed pumps and feed-water heater are set in a wing of the boiler house sealed off from the main building. There are two single-plunger Yough feed pumps, 16x8x18 in., one of which is held in reserve. The heater is set high above the pumps and is of open type 1200 hp., and was furnished by the Platt Iron Works.

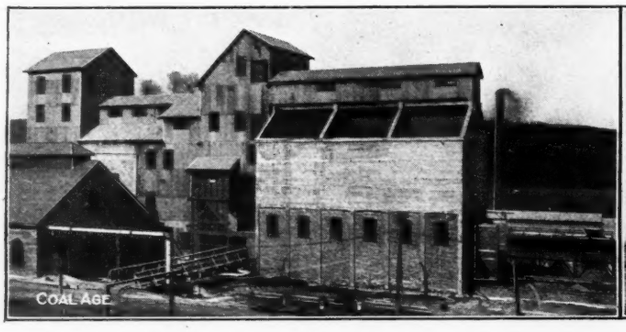
In this room is also set a small Ingersoll-Sergeant air compressor, which operates a Lagonda boiler-flue cleaner. The water forms a scale so that it is economical to clean boilers about once every six weeks. The fuel from the washer is sufficient to supply requirements at all times, no run-of-mine coal being used. Two firemen in daylight and one at night man the boiler house. Space is provided for two additional boilers.

Engine House

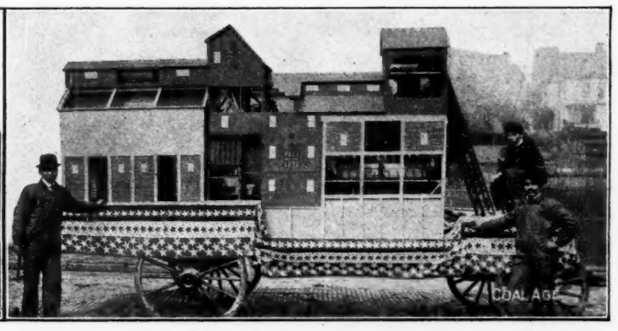
The engine house is set parallel and adjacent to the washery and is of brick with steel roof trusses, covered with slate. In this building is located one 150-hp., 250-volt Westinghouse direct-current generator, which furnishes all power for mine and coke yard. Two 200-hp. Erie City twin engines drive separately by means of rope transmission and shafts through the washery building the dry coal or preparatory machinery and the wet coal or actual washing equipment. The engine, which drives the washing machinery, also drives the circulating pump mentioned above. There is space in this building for two additional generators Thus practically all the power for the plant is developed in the one building and is tended by one man. When the generator has to be run at night the plant watchman attends it.

Repair Shop

The carpenter and blacksmith shop is the original frame building, equipped with a 7½-hp. motor and light shafting for small drills, saws, etc. The repair men are in charge of the master mechanic and consist of one machinist, three carpenters and a blacksmith and helper. A considerable part of these men's time is taken up in filling temporary vacancies of regular men in other parts of the work. The carpenters are also used at the Salem plant in emergencies.



View of Power House, Washery and Storage Pockets



Float Demonstrating Washer Constructed for Greensburg Centenary

Belgian Ovens Discharged and Coke Loaded by Machinery

The coking plant consists of 100 Belgian ovens, 5 ft. wide by 34 ft. long and 8 ft. high at the crown. The brick for these ovens were furnished by the Harbison-Walker Refractories Co. The frames of the doors are of cast iron and are lined with firebrick furnished by Hay & Rule. The charging larry was supplied by the Phillips Mine & Mill Supply Co., and was specially designed for the safety and convenience of the charger. The coke is watered by a machine, designed and built at the plant. This machine quenches 50 ovens in 8 hours with one attendant.

The coal charged in an oven is leveled by a machine in 2 min.; the ram pushes out a charge of coke in 1½ min. A pan is set at the opposite end of the oven to receive the charge of coke. This pan is provided with a screen set 12 in. off the bottom, which allows the ashes and breeze to drop through. A gantry crane picks up the pan and dumps the contents into the railroad cars. After every fourth oven, the ashes are dumped into mine cars running on a track on the yard.

Thirteen Men Run One Hundred Ovens

The leveler, pusher and loader were furnished by the Alliance Machine Co. When fully manned, this machinery is capable of handling 100 ovens per day, or an average of 600 tons. There being at present only 100 ovens, or 50 to draw each day, the labor force had to be arranged so that the men double up on machines. The man who runs the crane also runs the larry; one man runs both the leveler and the ram. In this way the labor cost is low. The total force consists of 13 men, including the foreman, a coke burner, a mason and an attendant.

Water is supplied from a large reservoir 5 miles away, the storage capacity of which is 300,000,000 gal. The water flows by gravity to the Salem plant and is pumped thence to storage tanks above Huron.

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New Coaling Equipment on the Great Lakes—The formal opening of the $2,000,000 docks and terminals of the Hocking Valley R.R. is scheduled for July 1. The docks are built entirely of concrete and have the largest coal and ore handling equipment at this end of the lakes. With the opening of the docks, the Hocking Valley will have many times its present coal and ore handling capacity. It will therefore be prepared to meet the increased coal tonnage when the Chesapeake & Ohio builds its proposed line from Portsmouth to Columbus, thus giving it the shortest route from the coal fields of West Virginia and Kentucky to Toledo.

The proposed new route of the C. & O. will parallel the tracks of the Norfolk & Western but according to the published announcement the former will not compete for the local traffic, the extension being used only for through traffic. When the new docks are opened the Pennsylvania will take over the dock machinery and other equipment on lower Summit St., heretofore used jointly by the two roads. The new terminals and docks of the Pennsylvania Co., at Sandusky are expected to be ready for use by July 15. A force of 400 men are now busily at work on these improvements. In making room for the new tracks it was necessary to make a fill nearly a half mile long and 20 ft. deep. Seven tracks are being laid to the new loading machine, five for loaded cars and two for empties. All the time the work of improvement has been going on the docks have been used to their full capacity. When the new docks are completed the capacity will be trebled. The present dumping machine has a capacity of a car every three minutes while the new one will handle a car every minute and a half, the two machines taking a car a minute or a train of 60 cars every hour.

The opening of the new Wheeling ore hoists at Huron has been delayed because of defective parts found in the machinery. Under hydraulic pressure, defects, due to sandholes in the casting developed and it was necessary to dismantle part of the structure and the new parts are now being awaited.

Development and Present Status of Byproduct Coking in the U. S.

By W. H. Blauvelt*

SYNOPSIS—Byproduct coke is forging rapidly to the head, the production more than doubling during the interval from 1909 to 1913. Some of the enormous losses incident to beehive practice. Popular misconceptions regarding the high first cost of the byproduct ovens, and inferior quality of the product. American practice excels European.

The first byproduct coke in America was pushed from a plant of 12 Semet-Solvay ovens in Syracuse, N. Y., in December 1892, and the following year 12,850 tons of coke were produced. The following table shows the growth of the industry since that time in short tons:

Year	Beehive Coke	Byproduct Coke, Short Tons	Byproduct Coke, % of Total
1893.....	9,464,730	12,850	0.14
1901.....	20,615,983	1,179,900	5.41
1907.....	35,171,665	5,607,899	13.75
1908.....	21,832,292	4,201,p26	16.14
1909.....	33,060,421	6,254,644	15.91
1910.....	34,570,076	7,138,734	17.12
1911.....	27,703,644	7,847,845	22.07
1912.....	32,868,435	11,115,164	25.27
1913.....	33,596,669	12,714,700	27.45

The tonnage of byproduct coke produced in 1913 is over twice that for 1909. On the other hand, the production of beehive coke in 1913 was exceeded in the years 1907 and 1910.

Losses Incurred in the Beehive Oven

The waste of coal in the manufacture of coke has long been a reproach to this country, as compared with some of the European countries, and long after Germany had practically forgotten the wasteful beehive oven, a large percentage of the coke made in the United States has been produced by that process. Not only does the beehive oven destroy all the byproducts, gas, tar, ammonia, etc., but it also produces a smaller yield of coke.

Taking the average value per ton of the coal coked in the beehive oven, as given by the United States Geological Survey for the year 1912, $1.01 per ton, the loss of coal values that may said to have been destroyed in the beehive oven during the six years ending with 1912 amounted to $42,110,000. Using the United States Geological Survey figures again for the value of the byproducts, the total return from the byproducts that would have been recovered if this coke had been made in byproduct instead of beehive ovens, would have been $266,700,000. This makes a total waste in the six years of $308,810,000, or an average waste per year of over $50,000,000 of the country's mineral wealth. This enormous waste is a most serious matter from the point of view of the conservation of our country's resources, yet it is gratifying to note the rapidly increasing percentage of coke produced in the byproduct oven, so that this economic loss bids fair to be eliminated before many years.

To an owner of deposits of coking coal it is interesting to note the Geological Survey's statement that the average yield of coke from coal in byproduct ovens in 1912 was 74.9 per cent. and in beehive ovens 64.7 per cent., a difference in favor of the byproduct ovens of 10.6 points, or 16.4 per cent. In the coking of low volatile coals, such as those obtained from the Pocahontas field, this difference is even greater. The actual yields of coke from Pocahontas coal in the beehive oven are usually not over 60 per cent., while in the byproduct oven the yield is 80 per cent. or more. This means that any given acreage of coking coal of this quality will yield one-third more coke if byproduct ovens are substituted for beehives; or, if a given acreage will supply a blast furnace with coke from beehive ovens for 20 years, the substitution of byproduct ovens will add 6⅔ years to the life of the acreage.

Cost of the Byproduct Oven

It has been the general impression in many places that byproduct plants are very costly. A high authority, familiar with both beehive- and byproduct-oven practice, has worked out the following comparison from a careful

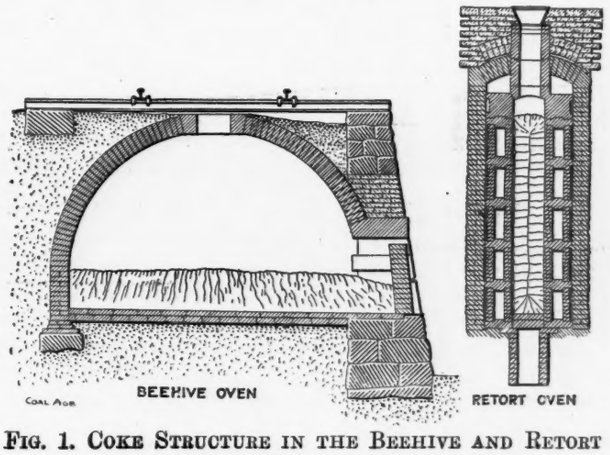


Fig. 1. Coke Structure in the Beehive and Retort Oven

analysis of many installations. In a coking field like the Connellsville, or other fields where the coal is well adapted to beehive oven conditions, the cost of a complete plant of beehive ovens, including all the accessories of railroad sidings, water supply, workmen's houses, etc., would be somewhat less than the cost of a byproduct-oven plant correspondingly equipped. In the Pocahontas district, on the other hand, where the coking process in the beehive oven is more wasteful, the byproduct plant can be installed at a smaller cost than the beehive.

There are now between 40 and 45 plants of byproduct ovens in the United States. In almost every case these plants are located at the point of consumption of the coke, rather than at the coal mines, as distinguished from the almost universal practice with regard to beehive plants. This fact, together with the very general practice in byproduct ovens of mixing two or more coals for the purpose of making a better quality of coke than could be made from either of the coals alone, has made available for coking purposes many coal deposits which could not otherwise have been utilized. As a result, many coal deposits are now recognized as yielding excellent coking coal which were formerly not so rated.

*Consulting engineer, Semet-Solvay Co., Syracuse, N. Y.

A Comparison of Byproduct and Beehive Cokes

The process of coking coal in beehive and byproduct ovens differs in one essential particular. The beehive oven is a circular chamber with a dome-shaped top, which gives the oven its name; it is usually about 12 ft. in diameter and 6 ft. high. The coal is charged into the oven through a hole in the top and levelled off into a layer about 30 in. deep. The coal is fired from the heat remaining in the walls from the previous charge, air being admitted through a side door, and the coking of the coal is effected by the combustion of the volatile matter with a partial consumption of the fixed carbon. The combustion is regulated by the amount of air admitted at the door and all of the volatile matter is consumed in the process, see Fig. 1.

The outside quenching removes the carbon glaze, familiar to all users of beehive coke, and in the early days the absence of this was counted a great objection to byproduct coke. This objection is no longer raised, and a prominent authority in blast-furnace work has recently published a statement that "today byproduct coke, which surpasses in quality most of our beehive product, and rivals the best, is made at several American plants." In the foundry trade byproduct coke has won an enviable position, and hundreds of thousands of tons of it are now being sold annually at a premium of from 50c. to 75c. above the standard grades of beehive coke.

Requirements of Good Coke and Difference in the Byproduct and Beehive Products

The development of the best cell structure is of the highest importance in the production of the best metallurgical coke. A well developed cell structure presents a large surface to the air, producing rapid combustion, while a strong cell wall prevents crushing and maintains an open fuel bed. Moreover, the relation of cell wall to cell space must be properly developed, in order that when the coke reaches the furnace tuyeres it can be attacked promptly by the oxygen in the air, with resulting rapid and intense combustion. A soft thick cell wall is objectional in blast-furnace coke, since it permits the oxidizing action of CO_2 gases in the upper part of the furnace by which the coke is wasted and the furnace top temperature increased.

But in foundry work it is more desirable to have a coke with a softer cell wall, smaller cell space, and a strong, tough structure. This permits the air to burn the coke immediately to carbon dioxide, with the production of the highest temperature in the melting zone of the cupola, and the weight of the charge is easily supported. This present practice seems to indicate that somewhat different treatments are required for producing the coke best suited to furnace and foundry practice.

The essential differences in the appearance of byproduct and beehive coke are first, the duller appearance of the former, on account of its being quenched outside of the oven, and second, the byproduct coke is produced in shorter, blockier pieces, as compared with the long finger-like pieces typical of the beehive coke. This difference is due to the method of applying the heat in the different types of ovens, see Fig. 1. In the beehive oven, the coking process works from the top downward, so that sometimes pieces are produced equal in length to the full depth of the charge. In the byproduct oven the coking process starts from both sides of the chamber, which averages from 18 to 20 in. wide, and proceeds toward the middle, so that the pieces will always be somewhat shorter than half the width of the oven.

It is natural that in the 21 years, during which the byproduct oven has been developed in this country, many improvements have been made, and in some respects, American practice has advanced beyond the latest progress in Europe. One of the most notable improvements has been the increase in the output per oven unit and per man employed. When the first ovens were brought over from Europe they had a capacity of 4.4 tons of coal per day, and one crew of of men was capable of handling about 25 ovens. This gave a capacity of 110 tons of coal per day with a unit crew. Today the most modern ovens have a capacity of 20 tons of coal per day, and improved organization and modern machinery permit practically the same crew to handle from 50 to 60 of these ovens, thereby coking from 1000 to 1200 tons, instead of the original 110 tons.

The use of silica material in all portions of the oven structure subjected to high temperatures has also brought improved results, as compared with European practice. The European brick makers have not as yet successfully adapted silica material to oven construction. The higher refractoriness and greater conductivity of silica has been one of the important factors in the larger output of the American oven, and the abiltiy to maintain higher coking temperatures has been a material help in developing the best coke structure from the various coals employed. The modern American oven cokes from one-third to one-half faster than ordinary European practice, and as stated above, the improvement in the quality of the coke from the American furnace man's point of view is quite as important as the larger output by the shortened coking time.

The Modern American Byproduct Oven

A typical modern byproduct oven is illustrated in Fig. 2. Each oven is equipped with a pair of regenerators which preheat the air to about 1100 deg. C. Since the oven gas used for heating carries from 500 to 600 B.t.u. per ft., the temperatures in the heating flues can be maintained quite as high as even the refractory silica brick can stand. The gas is admitted at several points in the series of flues, and by this means, it is possible to maintain the entire surface of the oven walls at a uniform and high temperature.

To control the temperature in all parts of the oven is of the greatest importance since any comparatively cool spots delay the operation, and part of the coal is overcoked, while the cooler portions are finishing their work. The operation of the regenerator is, in general similar to that of an open-hearth furnace except that an entire block of 60 or more ovens is reversed at one operation by means of reversing dampers arranged at the end of the block. The air enters at the bottom of the regenerator, rises and passes through the flue system, meeting the gas at the several burners arranged at the ends of the combustion flues. On reversal the air enters the other regenerator, rises through the air flue, shown in dotted lines at the left of the illustration, and descends through the horizontal combustion flues, meeting the gas as before. The products of combustion pass out through the other regenerator to the reversing damper and the stack

in the usual manner. By this system the entire series of combustion flues is swept by all of the air required for combustion, as well as by the products of the burning gas, so that hot spots are prevented, and a uniform temperature is maintained throughout.

Fig. 2 also shows the charging car on top of the oven with openings for delivering the coal into the oven, and at the left an opening providing for carrying away the gases to the apparatus for recovering the byproducts. On the left is shown the head of the pusher for discharging the coke, and on the right the car standing ready to receive the coke as it is pushed out, and in which the coke is quenched.

Recovery of the Byproducts

The byproducts recovered from the coking of coal in a byproduct oven consist mainly of ammonia, tar, benzol and gas. When the gases are driven off from the coal by the heat of the oven they are usually cooled and then scrubbed in a suitable apparatus. The cooling takes out the water vapor, together with part of the ammonia and most of the tar. This cooling is usually done in large cylindrical vessels where water is used as the cooling agent, either passing through tubes arranged like a vertical boiler, or the water is showered over a series of grids in direct contact with the gas.

The scrubbing of the gas is effected in similar vessels arranged in series. As water has a strong affinity for ammonia, it is a very effective scrubbing agent. In this method the ammonia is recovered in the form of a weak impure solution of ammonia and water, the ammonia averaging about 1 per cent. This weak ammonia liquor is then distilled with steam, and purified and condensed into the ammonia of commerce, or else the ammonia gas from the stills is passed through sulphuric acid to form sulphate of ammonia, largely used in the manufacture of fertilizers. The tar is separated from the weak ammonia liquor by gravity, and is then ready for shipment or for distillation into pitch and tar oils.

In some of the latest byproduct oven plants the ammonia is recovered by what is known as the direct process. In this process the tar is first removed either by cooling the gas or by a scrubbing process, and the tar-freed heated gas, is passed through large vessels so arranged that the gas is forced through sulphuric acid, thereby removing the ammonia, with the direct formation of sulphate of ammonia. In this process it is essential that the tar be removed as thoroughly as possible, in order that the quality of the sulphate of ammonia may not be contaminated by the tar. After the tar and ammonia have been removed the benzol products are recovered by passing the gas in intimate contact with the heavy oil, which absorbs the benzols. The gas is then ready for use as a fuel, or in gas engines. In case the gas is to be sold for illuminating purposes the benzol is not removed. The utilization of coke-oven gas for illuminating purposes has developed much farther in America than in Europe. Several important cities use coke-oven gas as their only supply, while in a number of others it forms an important portion of the gas supply. From 50,000,000 to 60,000,000 ft. of oven-gas per day is sold for illuminating purposes in the United States.

Production and Marketing of the Benzol Products

In the recovery of the benzols, these products are removed from the heavy scrubbing oil described above, by distillation with steam, and are then separated by a fractionating process and purified. The benzol products are used largely in Europe for making dyes, and latterly also for motor fuel in place of gasoline. A recent British publication contained a list of over 400 towns and villages in the United Kingdom in which supplies of motor benzol can now be obtained. In America benzol products are only used to a small extent for motor fuel, but where used they have been very satisfactory, as they are more efficient than gasoline. With the rapidly growing demand for motor fuel, benzols promise to become an important factor in this trade.

The pure benzol products as produced from coke-oven gas are benzol, toluol, xylol and solvent naphtha, all of which have important uses in the arts. Owing largely to tariff conditions, the manufacture of chemical products from the benzols has not been developed to any important extent in America. The policy of taxing intermediate

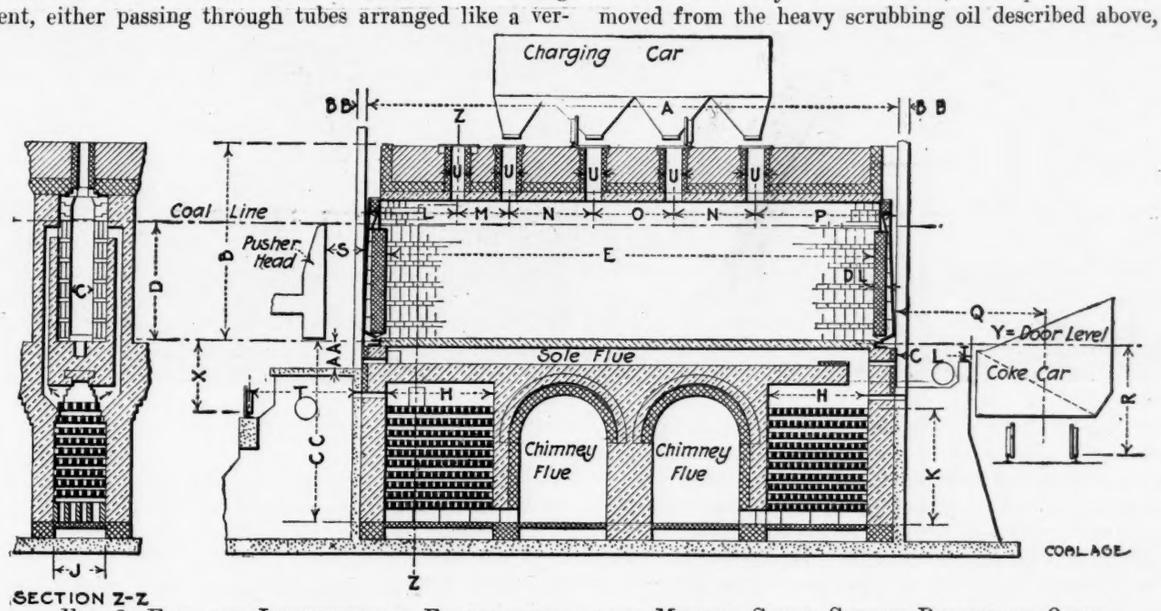


Fig. 2. End and Longitudinal Elevations of the Modern Semet-Solvay Byproduct Oven

products, while having the finished products, on which much labor has been expended, admitted free, has produced a condition which does not encourage the chemical manufacturers to invest in the necessary plants for this class of product.

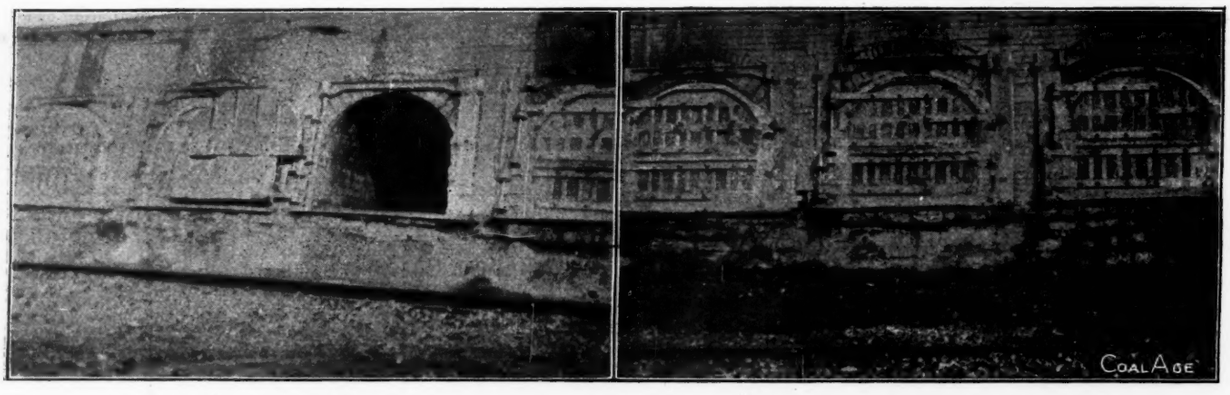
The operation of the byproduct oven calls for a high grade of technical skill and a combination of mechanical, metallurgical and chemical engineering. But the advance from the old beehive process is in accord with the progress that has been made in other technical industries, and in the conservation of our natural resources the byproduct oven has a place which is surpassed by few of our manufacturing processes and presents still further possibilities along this line.

Some Types of Coke Oven Doors

SYNOPSIS—The large doors of the rectangular (Mitchell or Belgian type) oven are expensive to brick up. Doors mudded around the edges have replaced them, but the life of these stoppings was at first short. This article describes the steps taken to make this necessary accessory as durable as the lining of the oven. The new asbestos-clay daub for oven doors is described.

The square of the beehive-oven door measured about 2 ft. 9 in. by 2 ft. 9 in. Above this square was a low arch with a spring of 9 in. Thus roughly about 9 sq.ft. had to be bricked up or mudded every time a charge was coked at suitable periods during the progress of burning.

The introduction of the Mitchell or Belgian ovens, in which there are two doors, and each of these is merely one end of the oven and has dimensions equal to those of the oven cross-section, made the cost of building doors an item of much interest. The Mitchell oven was adopted by those people who were looking for decreased cost of production and they naturally viewed the two large doors with great disfavor.



THE OVEN DOORS AT THE ACME PLANT, NEAR BENTLEYVILLE, PENN.

THE DOOR BUILDING OF THE MITCHELL OVEN COST FOUR TIMES THAT OF THE BEEHIVE

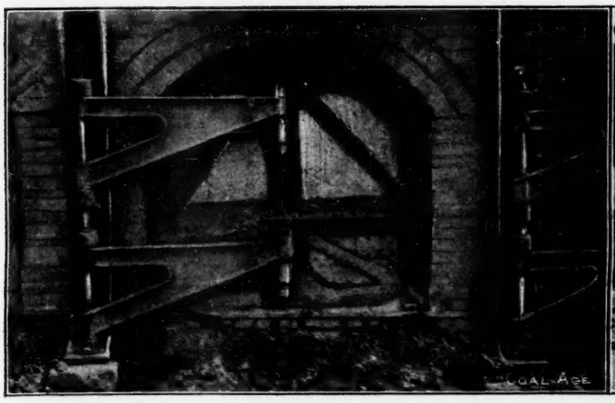
For instance, the door openings at the Acme No. 2 plant of the Pittsburgh-Westmoreland Coal Co., Bentleyville, Penn., illustrated herewith, are 4 ft. 10 in. to 5 ft. wide and at the top of the arch are 4 ft. 7 in. high. Thus 42 sq.ft. of opening approximately has to be filled and torn down with each recharging. It has been estimated that the cost of this work, including the mixing of the clay and coke breeze for making the door airtight, would be about 50c. per oven. However, whatever may be the cost, the filling up of the doors of a Mitchell oven with brick would be 4.6 times as expensive as the closing of the single opening in an oven of the beehive type.

To save this expense, doors were introduced, but they were found most expensive to keep in repair. They were barely put in commission before they had to be renewed. Now, however, there are several doors giving effective service. The difficulties to be met were four—to discover a door which would stand the heat, one which would not be too heavy to handle, one which would not rack itself by its own weight, and one with such favorable conditions for expansion and contraction that heating and cooling would be without evil effect.

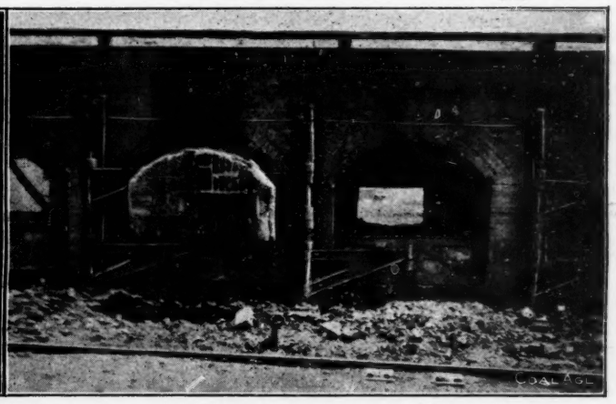
THE OVEN DOORS AT BENTLEYVILLE, PENN.

It will be seen that the door is so arranged, as are, indeed, all successful doors, so that its iron framework does not come in contact with the fire, but is protected by 2 in. of firebrick, which is kept in place by being molded integrally with a wedge-shaped back, which fits into the door frame. The whole face of the door between the iron work is usually plastered with clay and this prevents air from passing through the door between the loosely fitting firebrick. The iron in the door castings is specified as No. 1 Bessemer or Cherry Valley foundry iron.

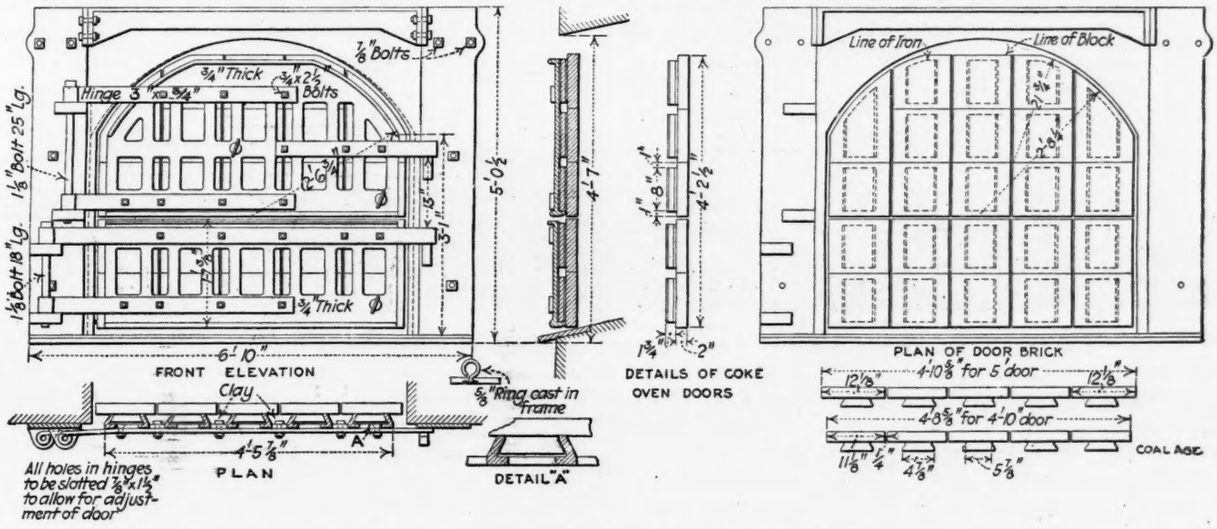
These doors have been in use about three years and they have given complete satisfaction. It will be seen that they are made in two parts. The lower half reaches to the level of the top of the charge and is closed before the coal is run into the oven. The upper half is swung too, and is mudded later as the oven gets hot and all the cracks are carefully mudded so that the oven is as effectually closed as if walled in. Each part of the door is hinged on one side and has a latch by which it is secured, and in the lower half a ring by which the



HAY-RULE DOOR AS INSTALLED ON THE PUSHER SIDE



THE SAME DOOR WITH UPPER LEAF SWUNG WIDE OPEN

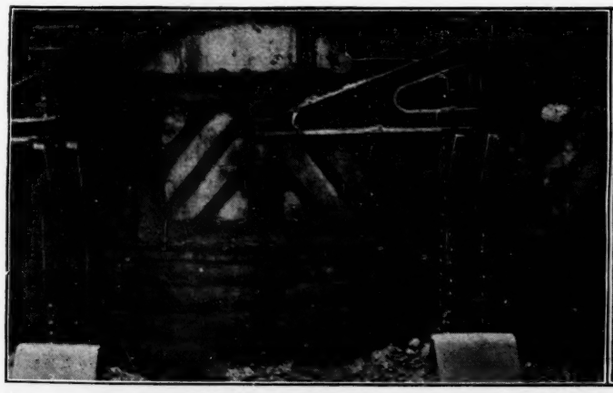


COKE-OVEN DOORS INSTALLED AT ACME PLANT OF PITTSBURGH-WESTMORELAND COAL CO.

door may be swung open. Two laborers each mud 150 doors per day.

THE COKE-OVEN DOORS AT DENBO, PENN.

At the Denbo mine, at Reliance, a door is used which can be swung from a track, bracketed above the row of oven doors. This track projects somewhat, therefore, beyond the front of the oven wall. The suspension is by means of a hook attached to a small trolley wheel. This hook projects from the side of a bar and can be pushed into a hole at the top of the door and secured in place by passing the end of the bar into a catch on the lower part of the frame of the upper half of the door. The lower half of the door can be attached to the upper half, so that both can be swung from the track above, as has been described.



A DOOR FOR THE GANTRY END OF AN OVEN AT THE HURON PLANT NEAR NEW ALEXANDRIA, PENN.

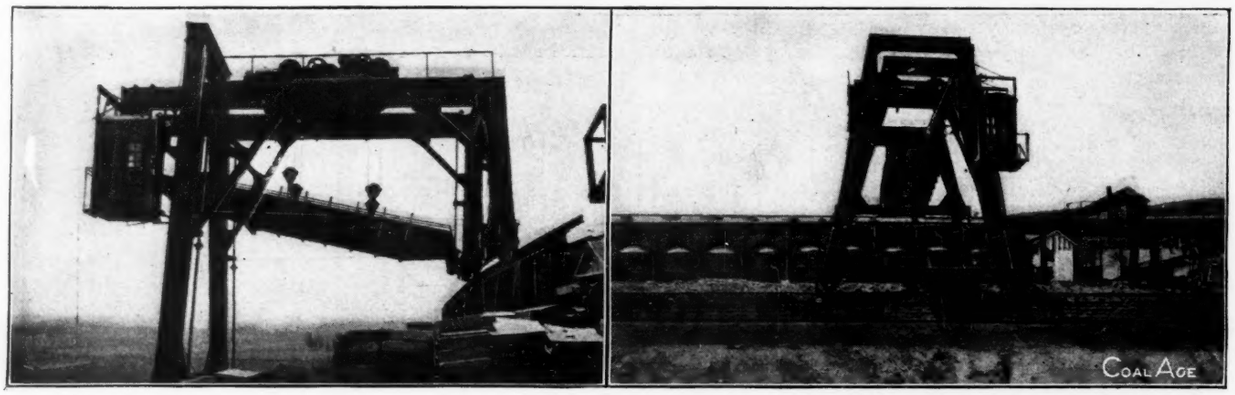
OVEN DOORS AT DENBO PLANT OF RELIANCE COKE CO. NEAR BROWNSVILLE, PENN.

The lower half of the door is none too heavy and is sometimes pushed out when, the leveler being at work, a large pile of coal runs forward onto the door. The round holes for airing the oven will be plainly noted. The one in the center line of the door and near the top is used for attaching the lifting hook. The oven wall, being on a slight batter, the weight of the door rests on the jambs and keeps the door in place. These doors have been in use at Denbo less than a year, but, so far, they are giving perfect satisfaction.

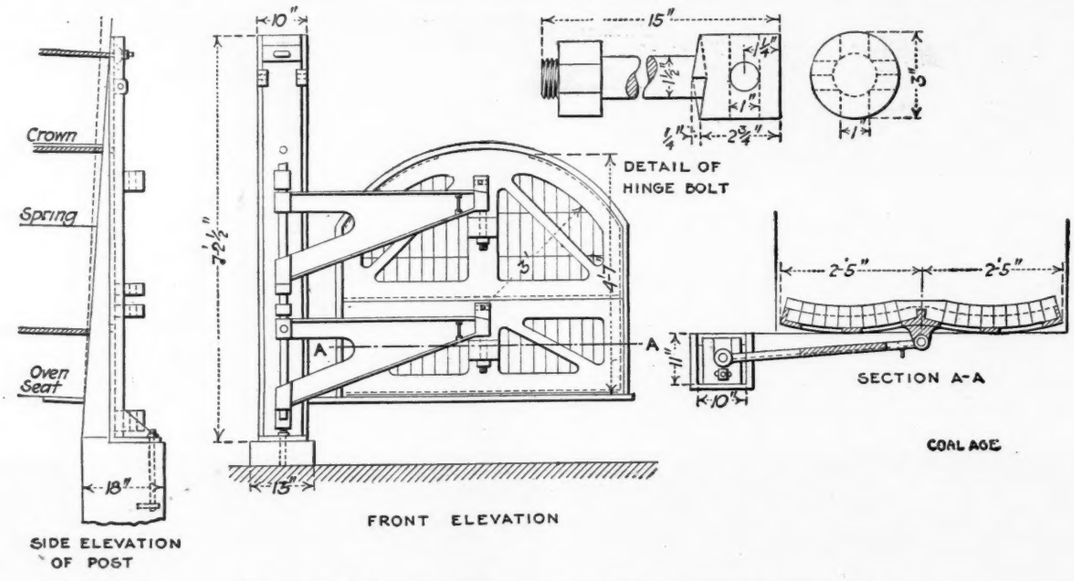
The Hay-Rule Door

The Huron plant, of the Keystone Coal & Coke Co., is using patented doors of R. Hay and P. B. Rule. by a cast-iron post, which rests on a small concrete base. The hinges are fastened to the post by a wrought-iron pipe and to the door section by a hinge bolt. The base of this hinge joint is in the shape of a helical screw, and as the supporting end of the hinge is made in a corresponding manner, it will be seen that a half turn of the bolt will raise the door, allowing it to be swung out.

On the crane side there is only one section to the door and this reaches almost up to the spring line of the opening. The balance of the door is filled with firebrick resting on an iron plate. The cast-iron posts which support the open doors on the pusher side are here replaced by posts, which are intended mainly to sustain an 80-



Two Views of the Gantry at the Huron Plant of the Keystone Coal & Coke Co.



Hay-Rule Door as Built for Pusher Face of Oven

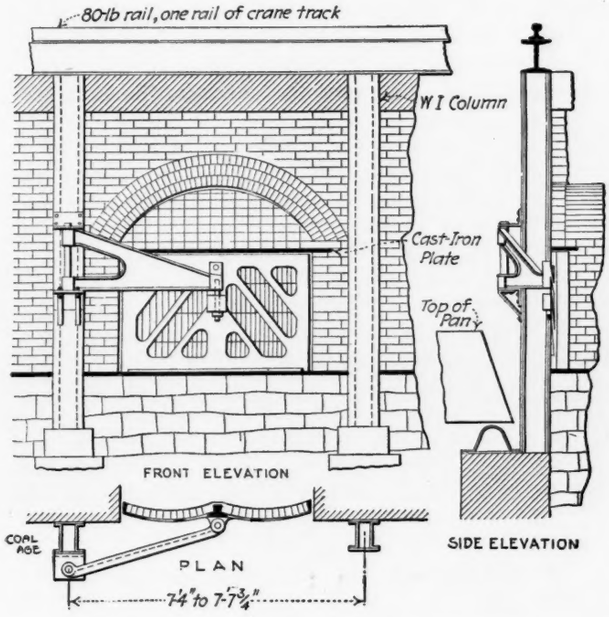
There are two types of these doors, those on the pusher and those on the crane or receiving side. The frames of the doors are constructed of cast iron, which holds the lining of arch firebrick. The door on the pusher side, when closed, occupies all the opening except about an inch on either side and a small segment on the top. These side spaces are closed entirely and the top space is arranged to be just enough to permit the charge in the oven the requisite quantity of air.

The door is supported when swung away from the oven lb. T-rail. On this rail the forward end of the crane for handling the coke travels.

The whole arrangement on both sides was installed three years ago and has given satisfaction. The doors on the pusher side and the upper segment on the crane side have needed few replacements and none of the doors on the crane side have had to be renewed. It will be seen that the doors "fit" snugly at the bottom and at the line common to both sections. The only extended mudding to be done is at the sides and top.

The Campbell Asbestos-Clay Daub

J. R. Campbell, chief chemist of the H. C. Frick Coke Co., has invented and patented an asbestos daubing material for coke ovens, and the Taylor Coal & Coke Co. has almost one hundred of them in service, some of which have been in operation since August. They are used with doors of the McMurray type. There are 12 doors at Lemont No. 2 of that type, and they are daubed with the asbestos-fireclay mixture.



Hay-Rule Door, Gantry End of Oven

It may be stated for those who do not know this type of door that it consists of a cast-iron plate with finger protrusions on which the asbestos-clay mixture is daubed. It was invented by William McMurray, superintendent of the Mount Pleasant Coke Company.

The material used is described as a special mixture of fireclay and asbestos, shipped out in the plastic state ready to be applied to the door. It must be well tamped into place and, if possible, the door should be allowed to dry out before being placed in service. However, that is not essential. A "green" door may be used without any harm being done. About 200 lb. is needed for an ordinary beehive-oven machine door. It is thought that one application, with a few occasional repairs, will last two or three years, though, of course, this will have to be ascertained in practice. So far the longest service has been for one year, at the Taylor Coal & Coke Co.'s Searight plant.

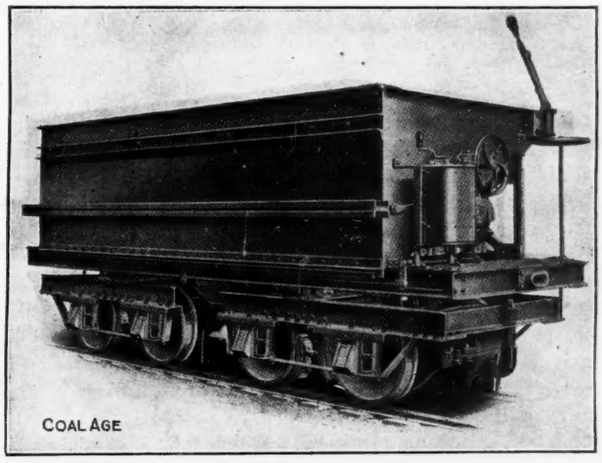
The material is made by the Harbison-Walker Co., and costs $10 per ton, f.o.b. cars, in minimum carload lots. In less than carload lots but in bulk, the cost is $12 per ton. If sent packed it will cost $4 to $5 more per ton.

A Slate Disposal Car

At many mines the disposal of slate and mine refuse from the tipple is a serious problem. Frequently mules are used for this purpose, while in some cases main and tail rope haulage is employed to move the slate cars on the dump.

The Atlas Car & Manufacturing Co., of Cleveland, Ohio, has brought out a line of self-propelled cars which appear to be admirably adapted to purposes of slate disposal, one of which is shown in the accompanying illustration.

The car shown, as may be clearly seen, is arranged for side dumping. It has double trucks built up of structural shapes. Two enclosed motors are supplied, operated from a drum type controller.



A Double-Truck, Side-Dump, Self-Propelled Mine Car for Slate Disposal

The car shown has a capacity of 200 cu.ft. The height above rail is 7 ft. 6 in., the width and length over all being 7 ft. 6 in. and 18 ft., respectively.

These cars may be made in many different sizes and types. Although the car illustrated is supplied with a trolley pole, it might with equal facility be equipped for operation by means of a third rail or be supplied with a storage battery. This latter arrangement would probably be the most convenient motive power for slate disposal.

Coal Freight Rates in Idaho—Freight rates on coal are to be made the basis of a suit before the Interstate Commerce Commission on behalf of the citizens of Boise and southwestern Idaho against the Oregon Short Line according to reports. The freight department of the road has been advised that the statements made by the coal dealers of Boise in respect to freight charged on coal from the Wyoming fields has caused much dissatisfaction.

The controversy is an outgrowth of the fight between the Boise school commissioners and coal dealers. Bids were asked for storage of coal, and as was the case in Salt Lake, all were the same. The coal dealers admit that they charge high prices, but insist that the Oregon Short Line refuses to weigh the cars at destination and that they have to charge for coal lost in transit.

According to the reports the utilities commission will bring suit before the Interstate Commerce Commission in the name of an individual, as the commission is said not to have the power to prosecute in its own name suits outside of the state courts. It will ask that the freight rates on coal from Wyoming points be reduced $1 a ton. The suit will also ask for the removal of the differential of 50c. a ton placed against Utah coal at American Falls. The coal dealers of southwestern Idaho say that this differential prohibits the shipment of coal from Utah into Idaho at a price low enough to compete with Wyoming coal. It will also be set up in the suit, that the Union Pacific owns the coal mines in Wyoming and that the differential is placed on the Utah coal at American Falls in order to bar Utah coal, most of which is mined by a subsidiary of the Denver & Rio Grande.

The Hillcrest Explosion

The explosion at Hillcrest is perhaps the worst mining disaster that ever occurred in Canada. Out of a total of 237 men who went down into the mine on the morning of the accident, only 41 were saved.

As the rescuers neared the seat of the explosion in the underground workings, the terrible force of the accident became more plainly visible; some of the bodies were literally torn to pieces.

It is probable that if General Manager Brown had not reversed the fan at the time he did, none of the 41 survivers would have been saved. Mr. Brown realized, immediately after the explosion occurred, that the first thought of the survivors would be to make their escape by means of the stope to mine No. 2. This conviction caused him to immediately reverse the course of the air. "When I felt that whiff of fresh air, I knew I was saved," is the statement of several survivors. They were about ready to give up in their fight for life when the fresh air came upon them.

Three of the rescue gang were overcome by gas and had to be carried out. The helmet men found bodies strewn in every direction and lying in every conceivable position. One man was found in a kneeling position with pick in hand ready to strike; when he was brought out, his arms were so rigid they had to be broken before they could be folded.

Joe Atchinson, a miner, was brought out and had every appearance of being dead. Some slight evidence of life, however, caused the doctors to work over him with artificial respiration methods. After some time, a faint flush appeared under the dust on his cheeks, and the doctors redoubled their efforts. The miner fought against them, and in his dazed state seemed determined to die, but after three hours he recovered and was soon able to assist in the rescue work.

Another miner by the name of Madison on his rush to safety passed many men who had just been overcome. One miner was struggling with his shoe, which had become fastened in a frog of the track. He finally succeeded in cutting the shoe from his foot and came out of the mouth of the stope with but one shoe. Madison, himself, says he felt inclined to lie down, but did not yield to the inclination and finally walked to safety.

The survivors have advanced different theories as to the cause of the accident. One man says it was a defective lamp; another believes it was a defective shot, while a third miner claims that a pocket of gas was liberated. All of these ideas are mere guesses, as none of the survivors was near the seat of the trouble. It is a fact, however, that for two days previous to the explosion, the mine had been idle, owing to slackness of business. During that time, gas may have collected in sufficient quantities to explode. Against this theory stands the favorable report of the fireboss who made his rounds before the men went to work.

Description of Hillcrest Colliery

Concerning the mine where the disaster occurred, W. J. Dick, Ottawa, Canada, has this to say: 'The mine is situated on a hill 1½ miles from Hillcrest Station. The mine tipple is on the valley level and is connected with the Canadian Pacific Railway by a spur track. The coal is brought from the mine to the tipple by means of a conveyor. There are three seams, of which only the upper one is being worked. The strike of the coal is northeast, and the dip 28 deg. to the west. The seams are badly broken by faults, and the coal is cut off by a fault at the face of the main entry, 4000 ft. from the entrance.

The room-and-pillar system of mining is used. Chutes 14 ft. wide and varying in length from 400 to 800 ft. are run up the dip. Room pillars are 50 ft. wide. The crosscuts are driven at intervals of 50 ft. An extraction of 65 per cent. is obtained. The pillars are removed by slicing on each side of the chute.

Gas has been found in the mine and Wolf safety lamps are used. The main road for 2000 ft. is lighted by electricity, 250 volts being used. All blasting is done under the supervision of shotfirers. Monobel powder, No. 6 detonators and fuse are used for shooting the coal. Holes are tamped with clay sent in from the surface. The mine is not subject to windy shots, nor has it experienced any previous explosion.

The mine has a capacity of 2000 tons a day, but only an actual average daily output of 800 tons.

The only other great accident in Alberta's coal-mining history occurred Dec. 9, 1910, when 31 men died in an accident at the Bellevue mine, not far fram Hillcrest. What the beneficiaries of the Hillcrest disaster will receive by way of compensation is a question that will come as an aftermath of the accident. The compensation act of Alberta decrees $1800 for each loss of life.

A Typical W. Va. Operation

Tipple over Railroad, and Retarding Conveyor for Lowering the Coal, Red Jacket Consolidated Coal & Coke Co., Red Jacket, W. Va.

Practically all of the machinery in this plant was furnished by the Jeffrey Manufacturing Co.

The Labor Situation

SYNOPSIS—Colorado is quiet but as the strike is not nearly settled and as the army may be removed before the militia regains its former strength, the prospects of trouble are imminent. In West Virginia peace seems insured. Some operators in Sebastian County, Arkansas, are trying to work without submitting to union dictation. In Ohio, there seems no hope of a wage settlement except in the lack of union funds. Iowa has agreed on a scale. In the anthracite region the certificating of mine foreman and the activity of safety inspectors are causing much trouble.

The fight between the Western Federation of Labor and the Industrial Workers of the World in the city of Butte, which is dominated by a Socialist administration, is convincing the world that dynamiting and murder are not always excusable avocations of a mining population. In this case there can be no talk of the iron heel of capital. If two factions of working men can so violently assault the other without excuse surely it is easy to conceive that one or either of them might assault another party, to wit capital equally without excuse. The Butte miners by their anarchy have weakened the sympathies of the whole country with the miners, whether of coal or copper, and disposed every one to accept the version of the operators concerning the Colorado trouble.

EMPLOYMENT OF MINE WORKERS

It is declared that the Colorado Fuel & Iron Co. is violating the proclaimed will of the Secretary of War and is bringing, into Colorado, men who are willing to work in its mines. This is not improbable seeing that the deliberate closing of certain of the plants and the crippling of others by governmental action is a high handed proceeding not at all justifiable under the circumstances and is obviously done not to preserve peace, but to legislate by force of arms. The autocratic manner in which this has been done would be more becoming in a mediaeval monarch than in a present-day appointee of the people.

GOVERNMENT HAS CLOSED NEARLY A SCORE OF MINES

The mines, the companies are endeavoring to recruit, are Sopris and Starkville. It is alleged that W. J. Gooden has smuggled men from New Mexico into Sopris under cover of darkness. It may be added that 19 coal mines are still closed down; Starkville, Santa Fé, Bowen, Empire, Thor, Southwestern, Wooten and Majestic in Las Animas County, Rockvale, Coal Creek and Fremont in Fremont County, Crested Butte in Gunnison, and Pictou, Maitland, Piñon, Rockland, Mutual, Gordon and McNally in Huerfano County. The strikers have driven the men out in the past and now the U. S. troops secure to the illegal forces of the union the ground they have gained in violation of the law, making the government a bulwark of violence and disorder.

SMALLER COMPANIES FACING FINANCIAL DISASTER

The chief sufferers appear to be the smaller companies. Their tonnage amounts to little, as far as the public is concerned, but much to themselves and they have registered a protest to the President. On June 18, J. A. Ownbey saw the President on behalf of the independent operators and represented that the closing of their mines by the union and the U. S. Army had made the financial difficulties so severe that the probabilities were that the stronger companies would eventually absorb them. And indeed reviewing the list of idle mines it is clear that the smaller mines have suffered most.

THE OWENS-KEATING RESOLUTION

The President is repeatedly stated to be about to compel arbitration and the Owens-Keating resolution in the House provides for a committtee to that end appointed by the president containing a mining engineer, a navy and army engineer, a man familiar with the handling of coal as merchandise, a sociologist and an employer of labor.

We doubt whether Congress has power to pass a law to determine wage and working conditions in any of the states of the union. It is hard to know what can be done by martial law because its limitations are ill defined, but constitutional law is less nebulous and a special law to regulate a specific industry at a special time in a certain section of the country and not applying specifically to interstate business is easily seen to be in conflict with our national constitution.

Mother Jones was finally admitted to Canada. The authorities were duly moved by clamor from the Canadian unionists and Mother Jones has been enabled and has fully availed herself of the opportunity to stir up strife between two friendly nations. She visited Nanaimo, Cumberland, South Wellington, Victoria and Vancouver. It is reported that she will speak in Charleroi, Penn., June 29.

Statements have been circulated that the pay-rolls of the Colorado Fuel & Iron Co. have been found to be heavily padded and that among the present miners there is a large amount of dissatisfaction. It is stated that they were given on entering the employ of the company places of such a character that large earnings could be made with but little labor. These places are now exhausted and the men are being moved to points where to get a large wage involves more work.

THE MILITIA'S DEMORALIZED CONDITION

The militia of the state of Colorado is not in condition to take the field, should the army be withdrawn. The 4 per cent. bonds for their payment and further expenses have not proved desirable to the public especially as the bonds must be marketed at par. They have been advertised in New York, Chicago and in Colorado without success.

The militia men are still resenting the one-sided truce called after the Ludlow battle and fear that the weakness displayed at that time may again put their lives in needless jeopardy. The strikers repeatedly broke their obligation. Gov. Ammons, despite this fact, kept his agreement, and as a result the militia was easily outnumbered by the movement of the strkers and the bands of militiamen were unable to go to one another's assistance. In all probability 35 officers will resign.

The report of the court martial of the Ludlow militiamen is not yet made public (June 23). All the men in troop A at Ludlow, including the 124 coal operators' employees, have received their pay. Governor Ammons, State Treasurer Leddy and Attorney-General Farrar voting for payment and Secretary of State Pearce and Auditor Kenehan voting against it. Company B has also been paid.

OPERATORS CONCEDE CHECK-OFF IN WEST VIRGINIA

In West Virginia a marked change has taken place. The operators who could not well be compelled by the arbitrating committee to pay a check-off, for some reason conceded it, stipulating that the amount collectible should not exceed $1.10 per man per month. The vote was taken on the proposition of the federal board of conciliation on the evening of the 22d and 23d, but the result is now declared irregular and the vote must be taken again.

It might be well to quote in full the recommendations of the commissioners, prefacing them with the remark that the public cannot expect the operators to defend them against iniquities such as the check-off. The people support such conspiracies by their influence and grumble whenever the effects are violence and slaughter and even the Department of Labor fully realizes that the most popular work it can perform is to aid the agitators to obtain funds for such desperate enterprises.

THE RECOMMENDATIONS OF THE COMMISSION

The following are the recommendations of the Commissioners of Conciliation who took under advisement the strike situation in West Virginia:

To the miners and operators of the Kanawha District of West Virginia, who are now in dispute and whose mines are idle and men are on strike:

We, the undersigned, Commissioners of Conciliation, duly appointed by the Secretary of Labor, recommend:

First. That the mines resume at once and the scale of 1912 be renewed for a period of two years, for the reason that we do not believe that there should be any change made in the terms and conditions of that agreement at this time or under the present business conditions.

In the event that either party is unwilling to adopt this recommendation we would then recommend that the miners return to work at once under the following conditions:

First. That the same wages be paid as were paid when the mines were closed down.

Second. That the operators pay the check-off for dues and assessments, not to exceed $1.10 in any one month, to the treasurer of the Local Union of the United Mine Workers of America, deducting the same from the wages of their employees for whom a scale agreement is made, when authority for such deduction is made in writing and releases the company from liability.

Third. That a Commission consisting of three persons, one to be selected by the miners, one by the operators, these two to select a third, and, in the event of their failure to select a third, then ten days from date the third member to be appointed by the Secretary of Labor from a list of five names jointly agreed upon to be transmitted to him within five days from the date of this recommendation, and, in the event that no list is transmitted the Secretary of Labor shall then appoint the third member of the Commission; this Commission shall be empowered to investigate and determine the actual wages paid for all classes of labor, and the tonnage rates, including such yardage as was provided for in the last scale agreement, in any and all mines which mine the same grades and character of coal, and which ship to the same markets at the same freight rate in competition with the coal mined by the operators of the Kanawha district of West Virginia.

Fourth. The Commission shall also be empowered, upon completion of its investigation, to fix the wages for all such labor ,and tonnage rates, including yardage, which shall be paid by the Kanawha Operators' Association to the miners in their employ during the life of a scale agreement which shall be immediately entered into by the Kanawha Operators' Association and the United Mine Workers of America, District No. 17, upon receipt of the finding of a majority of the Commission.

Fifth. The Commission shall render a decision within thirty days after its selection and the expenses of the Commission shall be paid jointly by the United Mine Workers and the Kanawha Operators' Association.

Sixth. The scale agreement signed upon receipt of the decision of the majority of the Commission shall be retroactive and cover the wages paid from the date of resumption.

We also recommend that rules shall be formulated in the new contract which shall provide for the settlement of disputes which may arise through Commissioners from the parties to the contract, who failing to settle a dispute, shall refer the matter in dispute to a Board of Arbitration; and that a further rule shall be made which shall enforce the carrying out of the contract by both parties thereto.

Respectfully submitted,

PATRICK GILDAY,
CHAS. W. MILLS,
A. L. FAULKNER,
Commissioners of Conciliation.

The second of these recommendations was accepted by the executive board of District No. 17 U. M. W. of A. and by the operators of the Kanawha district, but up to date it is not certain what the result of the referendum will be, the vote being exceedingly close, but probably in favor of that proposal of conciliation board, which the officials have seen fit to submit for consideration. The first which omitted the check-off did not meet with their approval. The second which may cause a reduction in wage is unsatisfactory to the men. They do not like to sacrifice wages for the privilege of having a check-off.

The fact that only the second of the two recommendations was submitted to the miners for ballot, has created much discontent. Thomas Haggerty, the international board member, received a telegram, June 4, from Secretary of Labor Wilson expressing surprise that the miners had not been given their choice of accepting either of the two propositions, or of rejecting both. Haggerty and Cairns in reply declared that both had been submitted.

Haggerty is extremely wrathful that the proposition he favors is not more popular and accuses some of the union men of collusion with the operators and as a result there has been a heated correspondence between Secretary Evans, of the Kanawha Coal Operators' Association and himself. In any event the strike cannot long continue. The union has neither funds nor harmony.

SUIT AGAINST MINERS' UNION WITHDRAWN

We are glad to note that the suit again John P. White and the other mine leaders is withdrawn because we do not like actions against the union to be entered except for the purpose of preventing them from performing illegal actions or to punish them for actual and not technical crimes. But the attorney's reasons for withdrawing the action and seeking a nolle prosequi are amusing if they are as related by the "Charleston Mail."

He is said to have pointed out that "while the organization might have affected competition in interstate commerce indirectly, it was not such as could be classed as a violation of the Sherman anti-trust law, the provisions of which are only applicable in cases where an agreement is made for the primary purpose of restricting interstate commerce to the advantages of one class and the detriment of another."

COMMENDABLE INACTION FOR A STRANGE REASON

Who ever violated the Sherman Act for the primary purpose of breaking its provisions? Does not every rich man who violates it, do so to make more money? Similiarly the miners were breaking it that they might make bigger wages. If this is an excuse, murder is not a crime because no one violates the law for the purpose of breaking it, but with the idea of killing his man. We are glad the miners are not to be prosecuted, but we are sorry that such a flimsy excuse has been taken for doing nothing. As a matter of fact, everyone believes that there is a need for winking at some technical faults in working men which are barely excusable in men of large property. Hardly anyone believes that the union, though a trust, should be suppressed. Beside faith in the Sherman act even for the rich is on a decline.

FOUR STATES AND MILBURN COAL COMPANIES

The Four States Coal Co., at Dorothy, W. Va., on Coal River has so far not settled its dispute. The rate at this mine has hitherto been 26½c. per ton for machine work and 31½c. for pick work, which latter rate is only operative in the drawing of pillars. The miners think the price should be equal to that paid for mining the Coalburg seam, which is 32½c. for machine loading in rooms and 56½c. for pick mining. They also want the check-off, though the ton rate is the main burden of their requirement. They also desire a shorter day and a 9-hr. day has been conceded by the company to take effect when the scale shall be signed in place of the 10-hr. day now worked.

The Milburn Coal Co., operating at the head of Paint Creek and mining gas coal desires a rate of 25c. a ton for machine-mined coal as in the present contract. The miners would raise this rate to 26c. The company produces no pick coal. The miners are on strike though the Union officials promised to keep them working until the Kanawha scale was settled.

THE TROUBLE IN ARKANSAS

The Bache interests in Sebastian County, Arkansas, some months ago, concluded to abrogate their contract with the union on the ground that they could not operate successfully under the scale in force. We do not know the nature of the agreement, but if it was for a specified time and did not give the Bache interests the right to nullify it at will, then the action which they took must subject them to the strongest criticism, though it must be conceded the unwillingness of the union to abide by its bargain and its frequent violation of its agreement furnished an excuse for nullifying the contract as was the case in central Pennsylvania. It is stated that the reason why the mining of coal was not profitable was because the mines were not properly operated, at least, Labor Commissioner J. C. Clary makes this statement in his report to Governor George W. Hays.

TROOPS BEFORE TROUBLE

Frank A. Youmans, of the federal court, enjoined the union not to interfere with the reopening of the Prairie Creek Mine No. 4 of the Mammoth Vein Coal Co., at Midland, Ark., on the St. Louis and San Francisco R.R. and the district attorney requested Franklin Bache not to begin hoisting coal until sufficient force was secured to assure them that the injunction would not be violated. On June 3, between 40 and 50 armed deputy United States marshals left for Midland to establish a guard about the property. According to U. S. Marshal Frank Mayes, none of the men who were employed by him had served as mine guards for the company.

On June 5, J. V. Bourland, the U. S. District Attorney, was ordered by Attorney General McReynolds to withdraw the deputies.

OHIO WAGE SCALE

So far no agreement has been effected in the state of Ohio and none may be expected for some time. On June 25, the eastern Ohio and Cambridge district operators withdrew from the joint-wage conference. The tonnage of these operators is about 20,000,000 tons or nearly 60 per cent. of the whole Ohio output. Still the conference continued in session, the Hocking, Pomeroy, Jackson, Crooksville and a part of the Bergholz districts trying to effect an agreement.

The operators offered a rate of 43c., which was an increase of 1.88c. on the 41.12c. previously offered. The operators insisted that if an agreement was made, no contract should be made thereafter with any other Ohio district at a lower figure and to this National Secretary-Treasurer Green alone assented.

The operators in five subdistricts mentioned, on the 26th inst. delivered an ultimatum stating that they would pay 44.69c. a ton for machine-mined coal on the mine-run basis, which is virtually the same as the mine-run rate in the Pittsburgh district, and 3.57c. more than the original offer. The miners want 49.65c. for machine and 71 $^{3}/_{7}$c. for pick-mined coal feeling that they are entitled to a better rate than Pittsburgh miners because of the cleaning which must be done,

because the coal has several bands of impurity. On the other hand, the operators having to compete with Pittsburgh coal feel unable to concede such a differential.

The Industrial Workers of the World have been organizing and urging the miners of Ohio to stop the passage of West Virginia coal through the disaffected districts, as this coal is replacing the Ohio coal on the markets. The method of "direct action" is openly advocated and the miners are urged to blow up railroad bridges and tie up traffic. The trains in Belmont County are moving slowly and guards have been placed on duty at the Little Grave Creek bridges above the Baltimore & Ohio R.R. passenger station, at Moundsville, W. Va., and at the Big Grave Creek bridge just near that city. The Benwood-Bellaire bridge is also being guarded.

IOWA WAGE AGREEMENT SETTLED

About 17,000 miners composing the Iowa district No. 13, voted on the 16th whether to accept or reject the wage scale under which they were working. The vote carried by 6136 to 3624, only 9760 out of 17,000 voting.

ANTHRACITE TROUBLES

The attitude of the Unions relative to the certificating of mine foremen will be noted editorially in our next issue, but we may say here that in accordance with the demand of the unions at the recent Pottsville meeting, on June 25 a suit was brought to restrain James E. Roderick, chief of the State Department of Mines from issuing certificates to 139 mine foremen and assistant mine foremen who passed the examinations held at Pottsville on May 25 and 26. James Matthews, president of district No. 9 brings the suit.

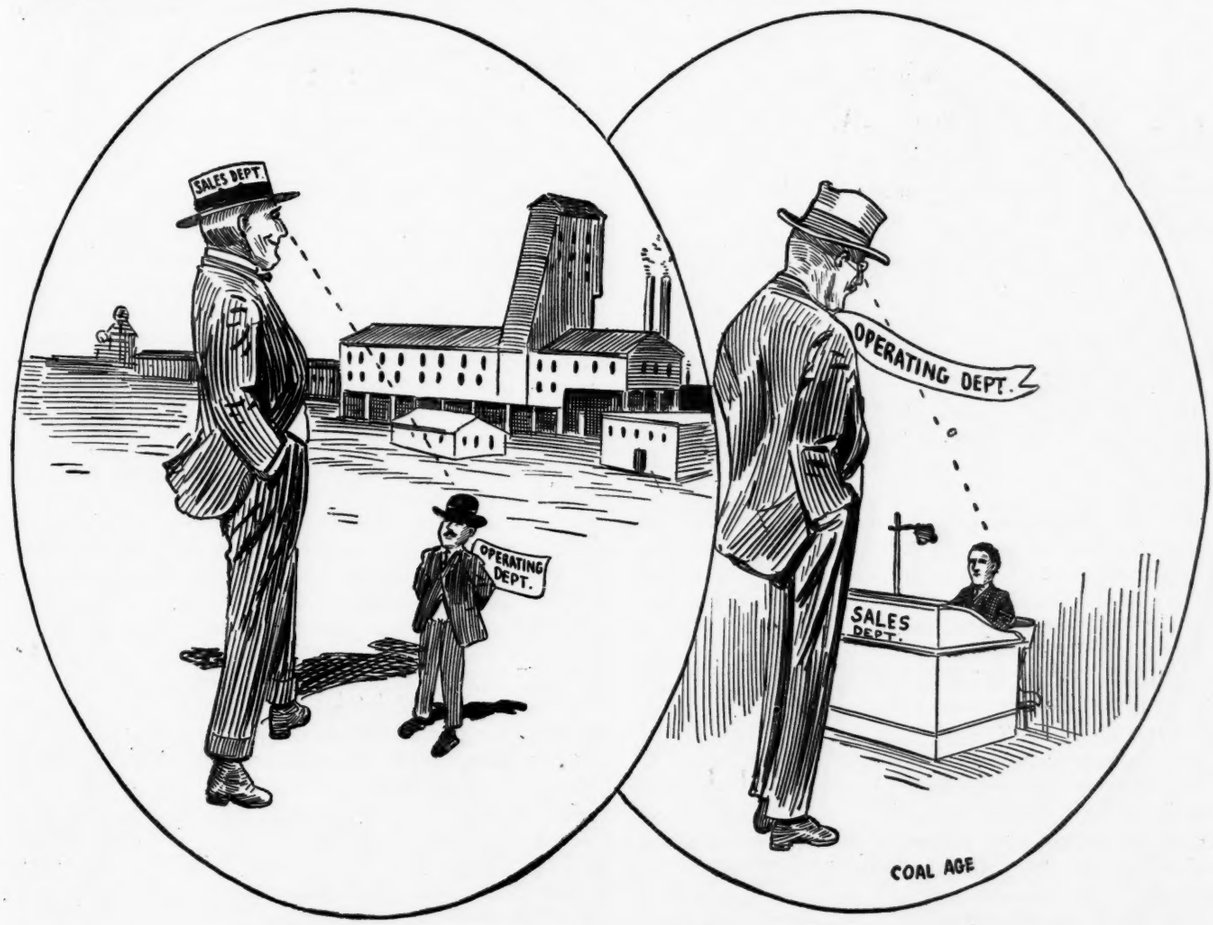
The Delaware, Lackawanna & Western R.R. coal department has had a dispute with its men who claim that the safety patrolmen have been making note of and reporting whether the men worked or not and have not confined themselves to their duties of protecting the men from the dangers of the industry. The miners desire that the patrolmen enter the union and declare these officials are underpaid. On the 24th the grievance committee of the 26 collieries, David W. Fowler, president, met Colonel Phillips, C. E. Tobey, P. J. Williams, Harry Davis, David Lloyd and Harry Harris and discussed the difficulty. It is said patrolmen will be told to restrict their activities to protection of the lives of the miners.

VANCOUVER NEWS

Robert Foster, president of District No. 28, notified the striking Vancouver miners that they must not be surprised if strike benefits were stopped at any time as the funds of the organization have been depleted. The organization had been paying them $15,000 weekly and $35,000 weekly to the Colorado strikers. Consequently it has been impossible to give relief to the Ohio strikers. Strike benefits might continue a week or even six weeks, but the men must not be surprised of a discontinuance at any time.

Notwithstanding the prospect of an early stoppage of strike pay the miners decided by 1467 to 274 in favor of a continuance of the suspension. It is interesting to note how few adherents the union in Vancouver now has. Meanwhile the mines in the district have all the men they can employ, the Western Fuel Co. having a waiting list of 100 men. No. 1 shaft at Esplanade in the middle of June hoisted 1121 tons, all the coal coming from the north side of the mine, the south side having been flooded when a fire started a year ago. The union would not permit the miners to wall off that part of the mine.

Attention should be called to the fact that the statement made by M. D. Foster, chairman of the House Committee of Mines and Mining relative to William Green, and published in our issue of May 9, p. 775, was declared by Green himself to be untrue. He stated, on being questioned by the Illinois District Mine Convention at Peoria, Ill., May 2: "I am not responsible at all times for what appears in the press reports, and take this opportunity of denying the article. I never agreed under any circumstances to waive recognition of our organization in Colorado."



How They Look to Each Other in Relative Importance

The Del Monte Process

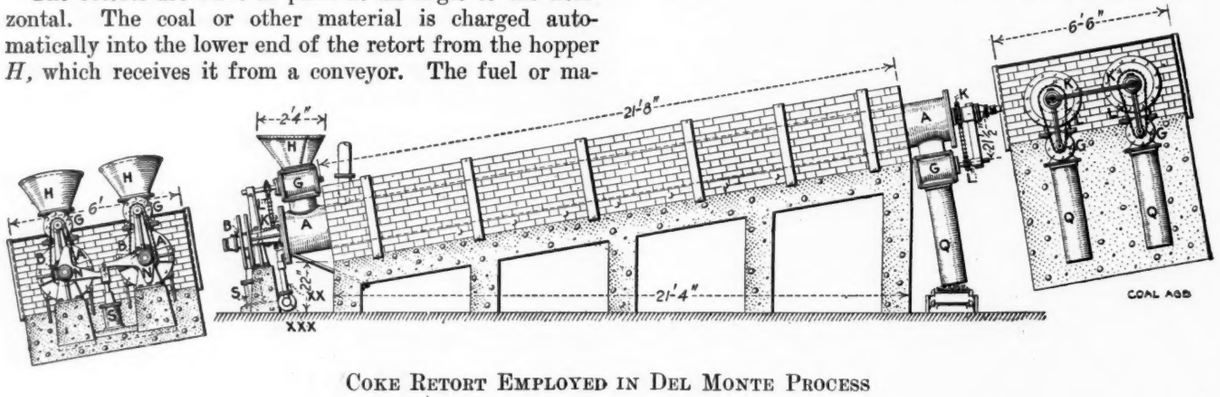
By Samuel Dean*

SYNOPSIS—By this process, oil, gasoline and paraffin wax are secured as byproducts in coke making as well as tar, gas and ammonium sulphate.

Through the courtesy of the Oil & Carbon Products, Ltd., an opportunity was secured of examining the Del Monte plant, which is in operation near London, England. As is well known, there is a great demand at the present time for "oil" and motor spirit (gasoline), and the future will see this demand increased. Anyone interested may well pay a visit to this particular plant.

Crude oil is here distilled from bituminous coals, cannel coal, shale and peat. The hydrocarbons are driven off at the different temperatures at which they vaporize, and are then condensed by being brought into contact with cooler material. The liquid obtained is not a heavy tar, but a true petroleum of the paraffin series, which yields by treatment 30 to 40 per cent. of motor spirit.

The retorts are built in pairs at an angle to the horizontal. The coal or other material is charged automatically into the lower end of the retort from the hopper *H*, which receives it from a conveyor. The fuel or material passes from *H* into an air-tight rotary valve *G*, the function of which is to prevent the inlet of air or the outlet of gas.



Coke Retort Employed in Del Monte Process

The valve *G* delivers into the tube or retort *A*. *B* is an interior tube which runs through *A*, an Archimedean screw conveyor being threaded thereon. The hydraulic ram *S* actuates the hollow tube and Archimedean screw through the levers *N*.

The fuel material after being divested of the required byproducts, such as oil, gas, etc., is discharged from the tube *A* through the valves *G* to coke conveyors by means of the pipe *Q*. The valves *G* are operated from the hollow tube *B* by the chain and sprockets *L* and *K*.

The retort is heated externally by gas burners placed in brickwork beneath it, and internally by similar burners placed in the hollow tube *B*. No condenser is required, the incoming fuel condensing the greater portion of the volatiles which run from the pipe *XX* in the form of liquid distillates. The incondensible gases pass off through pipe XXX, to be scrubbed for the recovery of ammoniacal liquor and light spirits. This gas is afterward used for heating the retorts and in otherwise carrying on the process.

The flame temperature of all the burners varies from 1000 to 1100 deg. F., and the material being treated never reaches even these comparatively low temperatures. Depending upon the nature of the material being treated, the time consumed during its passage through the retort varies from 45 to 75 min. The coke or other residue is discharged in a cool state and quenching is not necessary.

130 Gallons of Oil Is Sometimes Secured

The yield of crude oil varies from nothing to 130 gal. to the ton, according to the material being treated. A sample of Scotch cannel coal produced 85 gal. of oil to the ton, the specific gravity being 0.82 to 0.92. Such oil could be scrubbed and used for motor purposes, although, of course, not very satisfactorily.

The analysis of the cannel coal was as follows:

	Per Cent.
Moisture	3
Volatile matter	42
Fixed carbon	41
Ash	14
Total	100

The residue from bituminous coking coal is semi-coke or smokeless fuel, which is excellent for domestic purposes. Ten to 12 per cent. of the volatile is left in this residue and is sufficient to give free combustion. If metallurgical coke is required, the residue can be further treated at high temperatures.

Bituminous coal with 30 per cent. of volatile matter yields approximately $\frac{8}{10}$ of a gallon of oil per ton for each 1 per cent. of volatile; 30 per cent. of this will be motor spirit, 30 per cent. fuel oil, 40 per cent. paraffin wax and liquid bitumens. By sacrificing the last two, the yield of motor spirit can be increased.

Taking a ton of bituminous coal with an analysis as follows: Volatile matter, 35 per cent.; ash, 5 per cent.; moisture, 4 per cent.; fixed carbon, 56 per cent., the yield would be about 30 gal. of crude oil, which would convert into 12 gal. of motor spirit and 5 gal. of fuel oil. The byproducts would also include 56 lb. of pitch, 15 lb. of sulphate of ammonia and 1200 lb. of residue fuel.

The expense of the process would be about as follows:

The cost of retorting would be	24c. a ton
The cost of converting oil	2c. a gal.
Standing charges	24c. a ton
Contingencies	10c. a ton

A plant capable of treating 1000 tons a day can be attended to by 4 to 6 men per shift, with an almost entire absence of noise, smoke or external heat. The whole proc-

*Croppers Lathom, Ormskirk, Eng.

ess is mechanical and continuous, the charging and emptying of the retort being done automatically and without interruption. At the present time the plant is stopped every night and started again in the morning. Nearly always a different sample of material is tested each day, as within two hours sufficient heat can be gotten up to start running.

The capital outlay for a complete plant is, roughly, $500 per ton per day, or, in other words, $500,000 to handle 1000 tons daily.

Fifty to 60 gal. of crude oil were obtained from one ton of bituminous shale or "oil shale." This substance contained from 40 to 50 per cent. of volatile matter. Tests are being made of shales and other material from Utah, Wyoming, North Dakota, Australia, Africa and other parts of the world. The cost of mining shale, which lies in thick beds near the surface, with a steam shovel, should not be more than 10c. per ton.

It is interesting to note that the inventor of the Del Monte process, Smith Everett, is an American. His home is now in England, but he was born in Palmyra, N. Y., and learned engineering in the United States. He was formerly engaged in railroad work (electric and steam) in Cuba. Mr. Del Monte is a Cuban. The concessionaire is W. H. Heath, 154 Cromwell Road, Kensington, London.

The writer desires to express his thanks to the above gentlemen for courtesies shown him during his visit.

The Byproduct Coke Industry in Russia

A few years ago the byproducts from coke works here were allowed to go to waste, but now there are in South Russia 10 factories, owned by nine firms, for the production and utilization of these products. During the first nine months of 1913, these firms were operating 887 recuperative coke ovens, in addition to a larger number not of the recuperative type, the former producing byproducts. The monthly average number of working recuperative ovens was 825, as compared with 389 in the corresponding period of 1912. The increase in the last four years in the proportion of recuperating ovens to the total number of coke ovens is shown by the following table:

Year	All Ovens Number	Recuperating Ovens Number	Recuperating Ovens Per Cent.
1910	4524	344	7.6
1911	5024	344	6.8
1912	5318	799	15.0
1913	5747	907	15.8

The aggregate of European Russia's coal deposits was stated in a recent report of the Russian Geological Committee to be about 75,000,000,000 tons. As regards the quality, it is said that the Donetz basin is the only locality that can supply metallurgical coke. The following table, covering a period of 10 years, shows in tons of 2000 lb., the quantities of coal used for coking in Russia and the amounts of coke produced therefrom:

Years	Coal	Coke	Years	Coal	Coke
1903	2,774,733	2,020,831	1908	3,963,600	2,932,560
1904	3,656,362	2,639,920	1909	3,958,866	2,890,393
1905	3,559,610	2,597,676	1910	4,079,930	3,018,213
1906	3,415,098	2,479,249	1911	4,930,655	3,642,647
1907	3,823,380	2,794,860	1912	5,689,411	4,252,697

Prices for coke given out on March 31, 1914, were as follows: First quality, $6.87 to $7.72 per ton; second quality, $5.72 to $6.29; small coke, $2.15 to $7.44; metallugrical coke, first quality, $6.58 to $7.44; briquettes, $5.44 to $6.02.

Coke and Byproducts in South Russia

The nine firms previously mentioned produced in all of their ovens 1,788,660 tons of coke during the first nine months of 1913, of which 1,022,400 tons went through the ovens designed for recuperating byproducts. The following table shows, in tons of 2000 lb., the production of byproducts during 1911 and 1912, and the first nine months of 1913:

Byproducts	1911	1912	Jan.-Sept., 1913	Byproducts	1911	1912	Jan.-Sept., 1913
Coal tar	9049	13,916	30,771	Sulphate of ammonia	357	2445	10,434
Ammonia water (25% strength)	3295	5,548	13,228	Spirits of ammonia	141	92	120
				Pitch	2745	2889	9,969
				Heavy oils	2229	2369	8,909

The increase in production was due to increases in the size and the number of ovens. Sulphate of ammonia is beginning to be used in Russia as a fertilizer; but most of it is still exported, principally to the southern states of Europe. The pitch found ready employment within the country, where it is mainly, if not exclusively, used in the production of briquettes. The heavy oils are used to great advantage for the impregnation of railway sleepers. Many more recuperating ovens are planned for 1914 and it is believed that all the pitch produced will be absorbed by the rapidly increasing output of briquettes, of which it is expected that over 500,000 tons will be manufactured in 1914. Some years ago briquettes were manufactured in Odessa from cheap coal dust, but they fell into disfavor when they began to contain too much clay, sand, and ashes.

The development in Russia of the manufacture of sulphate of ammonia, spirits of ammonia, and pitch has resulted in the almost total cessation of imports of these articles. Benzol, phenol, naphthalin and anthracene continue to be imported because they are not produced locally.

The Coppe system of ovens predominates in south Russia, but many ovens of the Carway and Otto types are also to be found. The control of the sale of coke byproducts from south Russian works is almost wholly in the hands of a firm in Kharkof, which publishes no price lists and is very conservative about furnishing information as to the average prices of the byproducts that it handles. A list of the firms in south Russia engaged in the production of byproducts from coke may be obtained from the Bureau of Foreign and Domestic Commerce or its branch offices.—*Daily Consular and Trade Report.*

Value of Service

[Quoted by David Ross in address before mine inspectors' convention at Pittsburgh, June 11, 1914.]

Is your salary all you receive for your working?
Is it prospect of hunger that keeps you from shirking?
Do you toil for the coin and for that by itself?
Is your industry wholly a question of pelf?
If so, heaven pity you, poorest of men,
You ought to be back with the mollusks again
In time protoplasmic—'mid pliocene murk,
If your salary is all you receive for your work.

If there isn't a smile from someone well served,
If there isn't a soul whom your kindness has nerved,
If there isn't a service you've rendered—beyond
The price of a coupon or government bond—
If there isn't a thrill of achievement in
The work of your day—something worthy to win
Past cash—you're a negligible part of the mob,
If your salary is all you get out of your job.

—Strickland Galligan in Indianapolis "Star."

Coke Manufacture and Blast Furnaces in Inner China*

SYNOPSIS—Coke was first made without ovens; later hand-washed coal and rectangular ovens of clay or brick were built. The coke is principally used in the smelting of iron in small clay furnaces, blast for which is furnished by hand.

An experience of several years in the oldest mine of China, known as the Pinghsiang mine, the only one in that country producing coke in accordance with European practice in commercial quantities, afforded an opportunity to become acquainted with the original methods of coke manufacture pursued in the provinces of Kiangsi and Hunan.

INTERIOR OF A CHINESE FOUNDRY, SHOWING PRIMITIVE BLAST FURNACE AND MEANS OF SUPPLYING DRAFT

These methods, although relics of former times, are still largely followed, and a few ancient blast furnaces are yet in working condition. These furnaces, both in design and construction, give evidence of extremely early origin and are of especial interest to those historically inclined.

Following the fate of the ancient coke ovens, these blast furnaces are gradually becoming extinct, their disapearance being in direct ratio to the increase in the imported products—an increase which has been consistent in spite of the disadvantage of the great distance that separates China from foreign sources of supply.

The simplest method employed in the manufacture of coke consists in piling the coal taken from a suitable seam in a columnar form 16 to 19 ft. in diameter and 6 to 7 ft. high. Ignition is made at the bottom, and after the entire mass has reached incandescence it is covered from the bottom upward with a mixture of coke ashes and common clay. When the heat has cooled off after several days this jacket is removed, the coke then being available for distribution.

HAND WASHING IS EMPLOYED.

Since the combustion losses were over 50 per cent. and the supply of a suitable grade of coal was not readily available, the next step in the evolution of coke-making methods represented a great advance. The coal coming from the mines with an average ash content of 25 per cent. is first crushed by wooden mallets or beetles, and then washed by hand in wooden tubs. In these tubs a flat, open-sided trough or basket made of bamboo matting is swung back and forth in such a manner that the lighter or purer coal is washed off and deposited in the bottom. The remainder or heavier material left in the trough contains about 50 per cent. of ash content. This is used as a material for firing the coke.

When the tubs have filled up a sufficient amount with

*Note—Abstracted from a translation from "Stahl und Eisen."

the washed coal they are emptied into carrying baskets, which are transported to the ovens slung on poles between the shoulders of two carriers.

The washing of four tons of crude coal represents a day's work for a laborer, the compensation being 4 cents, in addition to which he receives his meals, which represent an equivalent of 2 cents. An analysis of the coke made from coal washed in this manner shows an ash content of from 10 to 14 per cent.

The coke ovens are made of air-dried brick or clay, the walls being about 16 inches thick. They are rectangular in form and open at the top. They cover a space of about 8 ft. 3 in. by 65 ft. 6 in. at the base, and are 2 ft. 5 in. high on the inside.

The ground forming the floor of these ovens is first well tamped and then paved with brick. Spaced about 3 ft. apart in the long sidewall are openings approximately one by two feet in cross-section, provided for ignition purposes. These are faced on the opposite wall by brick chimneys 3x4 ft. in cross-sectional area, and about 3 ft. high.

The openings above mentioned are filled with wet coal transported in baskets, while the charge for coke making is covered with unburned brick and dabbed with clay and ash in as air-tight a manner as possible.

The material previously placed in front of the ignition openings is then fired. When combustion has progressed through the charge of coal as far as the chimney on the opposite wall, all of the air openings are closed.

These ovens are calculated to contain a charge of about 24 tons, delivering aproximately 16 tons of coke, although the average may not be so high. The life of the fire depends largely upon the amount of rain which falls during the coking process. This often soaks through the coal in the ovens to such an extent that coking is prolonged three days or more, during which time the ignition fires are frequently restarted five or six times. Ordinarily, however, the ovens are not tampered with, so that a good quality of hard coke is obtained, possessing a compressive strength of 2130 lb. to 2580 lb. per sq.in.

The construction of these ovens is simple and inexpensive, and their operation requires but little attendance. The losses due to wasteful combustion and the nonutilization of gases, however, are correspondingly high, and the production of one ton of coke requires an equal amount of ignition material.

Notwithstanding the fact that the coke produced under these conditions is uneconomical in the light of modern practice, the method is doubtless practical for small mines having limited capital.

This coke is used by the Chinese for smelting in small continuous blast furnaces. Limonite or brown iron ore and hematite, red iron ore, are usually employed for this purpose.

SMALL CLAY BLAST FURNACES ARE EMPLOYED.

The type of blast furnace used consists of a conical vessel 6 ft. 6 in. high and divided into upper and lower halves. The walls are made of clay 12 in. thick, and the inside diameter at the top is 4 ft. and at the bottom 22 in. The walls are held together by circumferential iron bands.

Two openings lead into the bottom. The upper one serves as a passage for the air blast, and the other, which is closed by a clay plug, acts as a discharge for the pig iron.

To produce a draft a section of a hollow tree trunk is employed. In this a leather-packed piston is moved back and forth by hand. A suitable set of flap valves is employed, and the resulting air blast is conducted to the smelting furnace through a pipe.

The furnace is so arranged that for purposes of discharging its contents it can be tilted about 30 deg. toward the outlet opening. Charging is done hourly, brown iron ore and black sand, together with coke of the above manufacture, being mostly used. The output of such furnaces ranges according to the quality of ore from 1000 to 1500 lb. per day.

For smelting any given quantity of iron an equal weight of coke is necessary. Small pigs about 5 in. long and 1¼ in. square are cast from these furnaces, also small plates about 10x5x12 in. are produced. Although an analysis shows a comparatively high percentage of sulphur and silicon, this iron is not as brittle as might be expected. It is used chiefly in the manufacture of household dishes and utensils and in agricultural implements.

Ohio Breaks Coal Record

All previous records in the coal production of Ohio were exceeded in 1913, both in quantity and value, according to E. W. Parker, of the U. S. Geological Survey, notwithstanding the fact that coal-mining operations were seriously interfered with by an unprecedented flood in March and April of that year. It is estimated that the possible production was cut down probably 5,000,000 tons on account of high water.

In spite of this interruption the production increased from the previous maximum output of 34,528,797 short tons in 1912, to 36,200,627 in 1913, or a gain of 1,671,830 tons. The value increased from $37,083,363 to $39,948,058, while the average value per ton showed an advance of 3 cents, or from $1.07 in 1912, to $1.10 in 1913.

The average number of working days made by the employees was 206 as against 201 in 1912, and the average production by each man employed was 790 tons for the year, compared with 758 in 1912. In 1913, 32,642,848 tons or 90.2 per cent. of Ohio's total production was mined by machine. At the present time Ohio has less than 4 per cent. of the total output reported as shot off the solid. Out of a total of 1681 machines in use in 1913, 1421 or nearly 85 per cent. were of the chain breast type. Short-wall machines are growing in popularity as is indicated by an increase in their numbers from 106 in 1912, to 187 in 1913. The number of long wall machines increased from 2 to 17, and the number of pick machines decreased from 77 to 56.

Reports of the Bureau of Mines show that the coal-mining fatalities in 1913 numbered 165 as against 133 for the previous year.

Washington State First-Aid Meet

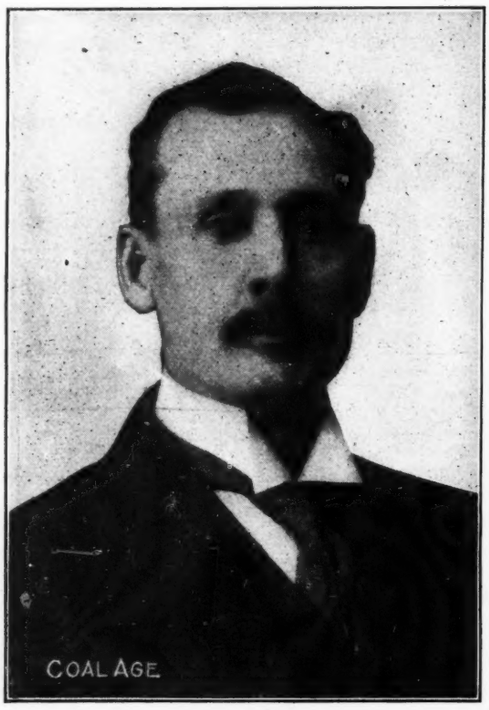
A first-aid and mine-rescue contest will be held at Seattle, Wash., on July 22 and 23, under the auspices of the Bureau of Mines, the Washington Coal Operators' Association and the State Mine Inspection Department.

Who's Who in Coal Mining

James Pearson

Out in Montana there is one man who graduated from the school of "hard knocks" and has succeeded with only that brand of college education. The fellow we refer to is James Pearson, who was born in Massillon, Ohio, 49 years ago.

He started as a trapper boy when 11 years old, and by the hardest kind of work advanced himself to the po-



JAMES PEARSON

sition of mine foreman with the What Cheer Coal Co. in Iowa. Later he became superintendent of the same company, afterward leaving the mines to accept a position as traveling salesman with the Harrison Machine Company The call of his early vocation, however, was too strong for him to resist, and he again took up coal mining, serving as foreman for the Sand Coulee Coal Co. in Montana. In a short time he was appointed superintendent of the Sand Coulee Co., later becoming superintendent of the Cottonwood Coal Co., another Montana concern, subsidiary to the Great Northern R.R.

Mr. Pearson's next position was that of manager for all the mines of the Cottonwood Coal Co. He continued in this capacity until he was appointed mining engineer for the Great Northern Ry. Co.

He is president of the Neal Creek Cattle Co., director of the Brown Coal Co., and president of the Sage Creek Coal Co., which corporation is opening a large coal mine at Lehigh, Fergus Co., Mont. He is also a member of the Electric City Club and the Elks Club, both of Great Falls, Mont. In addition, he is an executive board member of the Montana Coal Operators' Association. Mr. Pearson has been with his present company 22 years, and during that long period of administration has not had one day's shut-down on account of strikes. Nothing could bear more forcible witness to his ability as a leader and manager of men.

Henry S. Geismer

It used to be the vogue to always go West when seeking an avenue to dissipate business energy, and incidentally accumulate a bank account, but the direction of travel has changed somewhat, and many men look upon the South as the land of promise. One young man who has cast his lot in the southland is Henry Geismer. He first saw the light of day in Union City, Mich., early in the spring of 1875.

Mr. Geismer had excellent advantages in the way of an education ,graduating from the University of Mich-

HENRY S. GEISMER

igan as a civil engineer in 1897. Without wasting any time amid the pines of Michigan, he hit a hot trail for Alabama, secured a job right away as mining engineer with the Sloss-Sheffield Steel & Iron Co., later serving as engineer for the Tennessee Coal, Iron & R.R. Co.

This work occupied about eight years of Mr. Geismer's time and effort and prepared him well for his next job as chief engineer of the Republic Iron & Steel Co. (southern district). From 1907 to 1909 he filled the

position of general superintendent of coal mines for the last-mentioned company in the same southern district.

From 1909 to 1911 he was district manager of Georgia and Tennessee for the Southern Steel Co. While serving in this position he had charge of coal mines, ore mines, limestone quarries and two blast furnace plants.

In 1911 Mr. Geismer decided to start in business for himself, and formed the Keiser-Geismer Engineering Co. This new firm started business in September and met with much success from its earliest inception. In December, 1911, he was appointed receiver of the Chattanooga Iron and Coal Co., a $700,000 corporation. In December, 1912, he was appointed one of three appraisers for the properties of the Georgia Iron & Coal Co., a concern capitalized at $1,000,000.

He is a member of the American Institute of Mining Engineers and is a technical writer of ability and prominence.

Coke Crushers

By F. V. Hetzel*

SYNOPSIS—For best results coke must be split, not crushed. The most successful machines for this purpose are made with corrugated mating rolls built up of chilled segments. These should be provided with some means for uniform feeding.

In crushing run-of-oven size coke to smaller sizes, there are two important considerations: first, that the coke be reduced in size with a minimum amount of breeze or dust; second, that the crusher be such as to produce a fairly uniform range in the size of the product.

The brittle nature of coke calls for handling of somewhat different kind than that to which coal is ordinarily subjected. The coke should be split rather than hit or mashed, and the crusher should be such as to give the material this treatment with the minimum amount of contact between the lumps of coke and the crushing surface. On this account it has not been found practicable to size coke in crushers of the jaw or of the centrifugal hammer type. Two-roll crushers are in general use for reducing the size of coke, and these are of several varieties.

Over in England some gas works use a crusher which has spiral steel cutters, like lawnmower blades, mounted close together in the circumference of one roll, the other being made of a number of steel blades or disks with saw teeth, mounted on the roll shaft. The idea in this design is that the saw teeth act as a feed while the cutter blades shear the coke. This machine has not been used to any extent in this country, the disadvantage being that bits of coke wedge in between the saw blades, and in doing so and in being pushed out again some of the pieces are reduced to dust.

Some coke crushers in successful use have pyramid-shaped teeth, like those used on coal crushers, but the trend of modern practice is toward machines with grooved or corrugated rolls, the length of the grooves being parallel to the roll shaft. These grooves vary in width from 2½ in. to 3½ in. and in depth from 1½ in. to 2½ in. The grooves are rounded on the bottom so that pieces cannot stick in them, and the action of the machine is such that lumps which bridge over between the tops of adjacent grooves are split or cracked by the shearing action of the ridges on the mating roll.

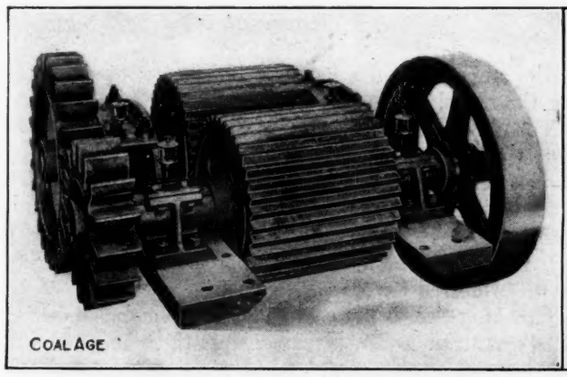


Fig. 1. Crusher with Chilled Cast-Iron Rolls

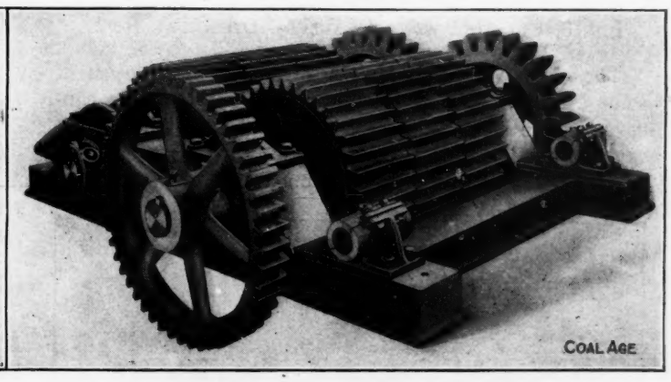


Fig. 2. Crusher with Rolls in Sections

Rolls of this kind are, in the smaller sizes (see Fig. 1), made in one piece of chilled cast iron; in some of the larger sizes, the rolls are made in sections which can be turned end for end or changed in position on the shaft if the diameter should become unevenly worn (see Fig. 2), but in the best crushers the rolls are built up of chilled iron segments bolted to heavy steel or cast-iron centers which are keyed to the roll shaft (see Fig. 3).

Feeders Are Necessary

In order to size coke properly the feed to the crusher should be steady and uniform and evenly distributed across the face of the rolls. If coke is drawn direct from a bin into the crusher, or if a skip load or carload

*Chief engineer, Link-Belt Co., Philadelphia, Penn.

is dumped into it, the crowding and tumbling of the material on top of the rolls causes useless breakage and the production of too much breeze.

At the same time, the middle portions of the rolls drag in more coke than the ends, and as a consequence the middle part has more work to do, becomes smaller in diameter than the ends, and it becomes difficult to maintain a proper sizing of the product. The same bad effects are produced if the crusher is fed by a chute which is narrower than the face of the rolls.

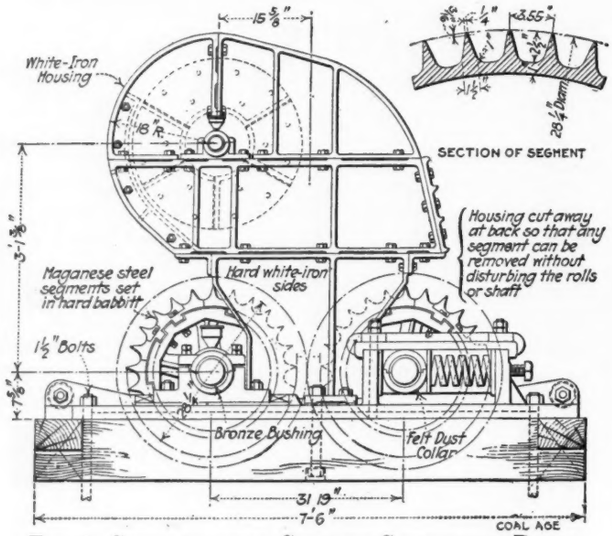

White-Iron Housing
SECTION OF SEGMENT
Housing cut away at back so that any segment can be removed without disturbing the rolls or shaft
Maganese steel segments set in hard babbitt
Hard white-iron sides
1½" Bolts
Bronze Bushing
Felt Dust Collar
COAL AGE

FIG. 3. CRUSHER WITH CHILLED SEGMENTAL ROLLS

The remedy for both of these evils is to use a feeder of some kind. Sometimes this is a belt conveyor or a conveyor of the steel-apron type (see Fig. 4). The advantage of the latter is that it works at a slow speed and will draw coke out of a dump hopper without that danger

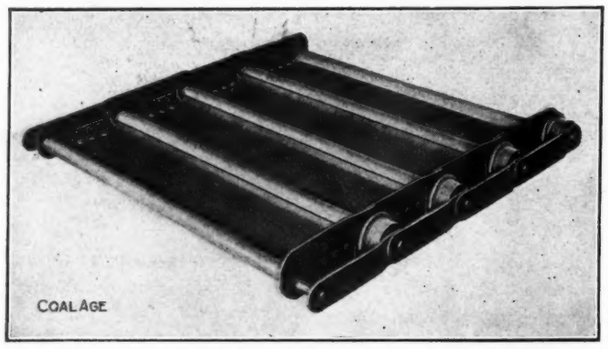


FIG. 4. SECTION OF STEEL APRON USED FOR FEEDING

to the carrying medium which is always present when a belt conveyor is used for feeding.

THE REVOLVING VANE FEEDER HAS DECIDED ADVANTAGES

Another feeder which has decided advantages is the ordinary vane or roll feeder, and when this is mounted directly on the crusher frame the installation becomes quite simple and compact (see Fig. 5). The crusher shown in the picture has rolls 31 in. in diam. by 30 in. long, mounted on heavy shafts geared together by long tooth spur gears, the teeth being made long so that the space between the rolls can be varied to produce crushed coke of several ranges of size.

The rolls are built up of chilled-iron segments bolted to cast-iron centers, and the frame or housing is so made that either shaft can be backed out of position and lifted clear without disturbing any part of the frame, feeder or the chutes. In a similar way any segment on either roll

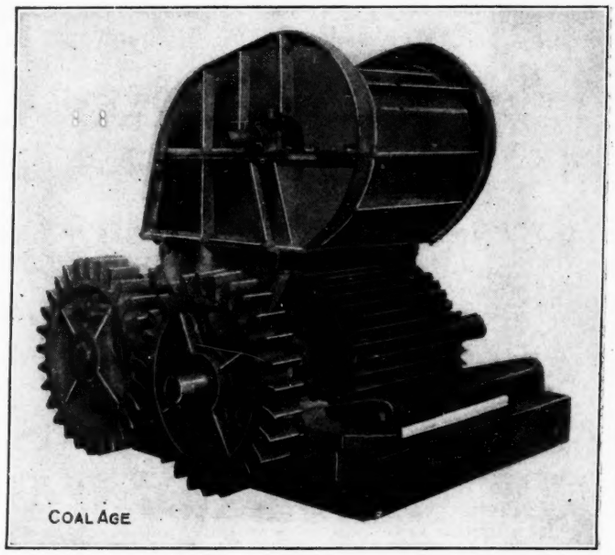


FIG. 5. CRUSHER WITH VANE FEEDER MOUNTED ON THE HOUSING

can be unbolted and a new one inserted without disturbing the roll shafts or the setting of the gears.

The feeder roll is made of hard cast-iron plates or vanes fastened to centers keyed to the shaft; a slow-speed drive is employed, and the plates or vanes pick up coke from the chute and deliver it to the crusher at a uniform rate. At the same time they distribute it over the full face of the rolls and prevent the uneven wear previously referred to.

Crushing coke is not easy work. It demands hard rolls, hard cast-iron housing plates, dust-tight protection for bearings and convenient means for copious lubrication. No crusher can be depended upon to give a perfectly sized product, nor one which is entirely free from breeze. Hence it is necessary to use screens for separating the sizes and removing the fine material.

American Mine Safety Association

The business meeting of this association will be held in New York City, Sept. 7 to 10, inclusive. The first-aid and mine-rescue contest will be held at Terre Haute, Ind., on Saturday, Sept. 12. The details are not yet fully arranged. H. M. Wilson, the secretary-treasurer of the association, may be addressed at the Bureau of Mines, Pittsburgh, Penn.

Apart from the high economy and reliability of large steam turbo units there are other reasons in favor of turbines especially for electrical work. The turbo-generator is capable of holding momentary overloads even up to 100 per cent. without detriment to the plant itself.

Editorials

True Fuel Economy

There are at some coke works as many as four possible sources of power, and at all two. These last are the waste gases in coke making and the coke breeze, which latter, though available for the raising of steam, has no commercial value.

In plants where there are washeries, there is also the washer refuse, which may be separated into two parts, a fair boiler fuel running about 16 or 20 per cent. ash and a worthless refuse which is only fitted for the culm pile. Perhaps if the boiler feed mentioned were properly dried, coal having even more than 20 per cent. of ash might be used with economy. However, at present, such use is not practicable as the boiler fuel contains 6 or 7 per cent. of "free" water and is usually fed by shovel, such wet and adhering coal not being mechanically stoked. Under these conditions, it does not pay to burn refuse having a lower thermal efficiency than that indicated.

Another source of power is often found in the roof of the mine; the "rooster bed" of the Pittsburgh seam, for instance, being nearly always too sulphury to convert into coke, but well suited for steam uses on the plant. In many cases, large quantities of this coal are brought out with that portion of the draw slate which is not stowed in the mine. This fuel piled with the slate in great hill-like dumps soon catches fire, burns and fills the valleys with sulphurous fumes and clouds of smoke.

These are the great losses in the coke region. We should perhaps lash ourselves into a fury about them, and imitate the conservationists in condemning the operators for them. Perhaps, however, the charge will rest more appropriately on other shoulders, for the losses will hardly be eliminated till there is a demand for power in those sections of the country where they occur. The mines, it is true, do themselves need power for their operation and this need is continually on the increase, but the many sources of fuel which the wastes provide cause the operators to utilize part of some one of these sources and neglect all the rest. Almost any one alone will give the average operator all the power he wants.

And in this condition there will be no change until the sections of the country now producing coal are supplied with factories and peopled with artizans making finished products. As long as the New England states and the state of New York produce the bulk of the articles in common use, largely out of raw materials manufactured in the coal-mining states, and as long as the fuel for the factories making these products is brought hundreds of miles over the railroads and along the American coast at a useless expense of more fuel, so long will other fuel values, too low grade to transport long distances, be wasted at their source.

One of the crying needs of industry today is for a relocation which will make operation cheaper. Manufacture and fuel should come closer together. We believe that in England the correct allocation of industry has been more nearly reached than in this country. Unfortunately, from an early date excellent railroad connections have made the separation of mine and factory less objectionable and wasteful than it well might be, but it is hardly necessary to declare that because the fault might be a greater source of loss than it is, is no conceivable reason why it should not be rectified.

A drift from the present coal-consuming to the coal-producing sections should have taken place long ago and even today such a tide of industry is not too late. We discuss freight rates and coal prices with unreasoning fierceness and talk economy with a convincing knowledge of thermal units, but might we not show equal discretion in discerning that freight rates will never be lower than when eliminated and fuel will never be cheaper than when we obtain it from the combustion of waste products? These eliminations and economies we can only secure by locating our factories where the logic of the situation would place them.

If you would take a short convincing course in "motion study," stand by a coal-carrying railroad and watch the cars passing by, transporting fuel that should never be transported and returning with manufactured products to the places where those products should have been advanced to their completed state. One-half our present-day travel is the result of a habit rather than the outcome of an economic study of the needs of industry.

And then the thoughtful observer seeing the riot of transport on our trunk lines, shuffling freight that never needed shuffling, will wonder whether a tariff between districts which would prevent fuel from moving to factories instead of factories moving to fuel would, on the whole, be a curse or a blessing to humanity in general and this country in particular. Would not such a measure, perhaps, unthinkable in some ways, tend to bring the coal consumer and producer into closer touch to the benefit of both?

The Good Faith of the Union

Settlements are still being made between miners and operators, though over three months have passed since the first day of April, the day on which the old scale expired. Yet outside of Ohio there has been no real suspension or strike in the central competitive district, though in some places the operators, and in some the miners, have been disposed to lay the mines idle, despite the vote at Indianapolis requiring a continuance of work during settlement. But on the whole, it must be conceded that J. P. White and his coadjutors have endeavored to keep faith with their declaration that they would not suspend or strike till it was clear that an agreement could not be secured by any other method.

We never suspected that Mr. White did not mean all that he said, though, of course, we knew, and the president of the United Mine Workers would not have denied, that he came to the conference with the strike as a potential weapon, even if he did not intend to use it. In fact, some think that he had already decided, when he came

into conference, that, if coaxing failed to accomplish his purpose, he would concede everything and indeed he ultimately did, after the nation's business had rapidly gone from bad to worse, and hopes for an increase in wages became nil. Some of the operators at the time, however, did suspect chicanery and frankly told him so. We are pleased to note that they were wrong.

Perhaps two years from now the leaders of the United Mine Workers will come to the conference having power, in case of a deadlock, to submit the matters at issue to arbitration. Meanwhile why not now discuss the basis on which arbitration should proceed? Otherwise, we shall establish a court without precedents and without known principles and may not find its decisions to our liking. Perhaps a constitution as a basis for decision would be a considerable help in making both sides willing to submit their case or ready to agree, before submission to arbitration becomes necessary.

When is a rise in rate justifiable? We fear some operators are a little disposed to say, "never, so long as it can be avoided"; whereas surely there are often good reasons for increases in wages, and a little investigation would furnish them as a basis for arbitration.

Looking backward, the doubts of Mr. White's faith seem ungenerous. He offered the operators exactly what they asked. They realized that he was making the public favorable to his ends by the concession and feared that he might be proposing nevertheless to play false. So they increased their demands to include arbitration. White might have been willing to concede it, but could not, in view of his instructions from Indianapolis.

The refusal to accede to arbitration did not prove bad faith and now we think it will be conceded that White never intended to do less than he promised. The logic of the situation and the pressure of bad times eventually proved that it was not for him to demand concessions, but to accept the operators' propositions unaltered. But in all the protracted discussions, he never shifed his position that there must be no strike, if an adjustment were obtainable without it.

Machine-Mining Fatalities

It is interesting to compare the fatalities in machine rooms with those in the breasts and pillars which are worked by hand, and to note how much fewer are the deaths resulting from machine methods than those resulting from pick mining in the bituminous mines of Pennsylvania.

SOME FATALITIES IN BITUMINOUS MINES OF PENNSYLVANIA IN 1912

Pick miners killed at face of workings by falls of roof.	92	
Pick miners killed on pillars by falls of roof	75	
Company men killed on pillars by falls of roof	1	
Total men killed in breasts and pillars by falls of roof		168
Miners killed by mining machines	1	
Machine runners and scrapers killed at face of workings	11	
Machine runners and scrapers killed removing pillars.	1	
Machine runners and scrapers killed by machinery	4	
Machine runners and scrapers killed by electricity at face or in entry	3	
Loaders killed at face of workings	28	
Loaders killed on pillar work	1	
Loaders killed on entries by electricity	3	
Total men killed in breasts and pillars where machines are employed		52

This shows that though more than half the coal (50.8 per cent.) was mined by machinery, not one-fourth part of the accidents occurred in machine rooms and pillars reckoning all accidents likely to be affected by methods of operation except possibly explosions of gas, dust and powder. To include these figures would hardly change the calculation.

These results are much more convincing than those in Illinois, which have excited so much interest and concern. They apply also to a state with almost three times as large an output and where we believe machinery is more evenly distributed. It may be said that they prove nothing absolutely, for machines are excluded from the most dangerous places, but we nevertheless believe that mining machines do help the safety movement.

They speed up recovery and so enable the coal to be mined before the roof is weakened, for there seems to be something in the theory that it takes time for a mine roof to break. They increase the output per man and so reduce the fatality rate per ton. They prevent blasting out of the solid and so render heavy shattering shots unnecessary. They make it needless for men to crawl under the cut in the dangerous manner of the pick miner and perhaps the reduction in the labor involved may render the machine cutter better able to attend to his roof testing. The greater frequency of inspection where a large tonnage comes from a small number of rooms may also be a cause of this better result.

Anthracite Region--A Modern Tower of Babel

The seven counties of Pennsylvania where anthracite mining is the principal industry, have a total population of 1,122,361 people, of which number 529,262 or 47.15 per cent. are foreigners, or the children of foreign-born parents. According to race, the Russians come first with 119,382; next in order come the Austrians, Irish, Germans, Italians, Welsh, English, Hungarians and Scotch.

Is it any wonder that the officers of anthracite companies, as well as the state inspectors, have difficulty in securing obedience to mine rules and mining laws? A large number of these foreigners are too old to master the English language, and it is because of this fact that the companies post notices in half a dozen languages.

When we consider this polyglot population, it is easier to understand the difficulties that invariably arise when employers and employees about the mines attempt to reach an amicable understanding in regard to wages and conditions of employment. Out of such a heterogeneous mass of men there is little likelihood of any large percentage of them gaining a correct idea of what it is they are contending for in their labor disputes. There is no doubt but that the labor leaders clearly understand the facts, but we doubt if even they can convey a lucid idea of their demands to the men they represent.

There is surely a wide field for effective work on the part of the state, the Y. M. C. A., and local mining institutes, in the hard-coal regions. Mining companies have of necessity come to a full recognition of the true situation and realize that their problems of ventilation, pumping and engineering are not of any greater importance than the vital question of educating and satisfying their employees. Industrial peace and industrial efficiency are essential to the success of any mining or commercial enterprise, and peace and efficiency cannot exist if the men entirely lack in understanding.

The successful corporations of the future will devote much time and effort to the study of social and educational work.

Motor Trucks for Handling Coal

That a large-capacity motor truck with power-dumping body may be just as efficient and economical on short-haul work as on long, has been abundantly proved again and again by the record sheets of the Youghiogheny Coal Co., of Pittsburgh. This company has shown it to be practicable to deliver from 250 to 400 tons of coal with a Peerless five-ton truck in a single night.

These tonnages have not been carried under special conditions, when the stage has been set for record-breaking, but were accomplished in the usual course of the company's business without any previous preparation whatever.

The Youghiogheny Coal Co. has a contract for coaling numerous large buildings in the downtown district of Pittsburgh. It operates a dock at the foot of Eighth St., where coal is unloaded from barges into overhead bins. The average haul from the dock to the various buildings which the company supplies is four-fifths of a mile.

On the night of Apr. 14, last, truck "C" of the company's fleet—a five-ton truck—left the dock on its first trip at 6:30 o'clock. By 11:30 o'clock it had hauled 30 loads to the Oliver power plant. Two loads went to the Fort Pitt Hotel, between 11:25 and 11:36 o'clock. Seven loads to the Union bank building took from 11:45 to 1:22 a.m. From 1:37 to 4:22 a.m., 11 loads were carried to the Farmers' Bank building. These 11 loads, owing to conditions at the building which make it necessary to unload with a slide instead of a rear dump, required as much time as 18 loads to the other buildings.

These trips consumed 10 hours. A total of 51 loads had been hauled, amounting to 316 tons 928 pounds.

The truck continued to be operated by the night shift for an hour and thirty-five minutes longer, carrying nine additional loads to the Oliver power plant, and one more to the Fort Pitt Hotel. This brought the total volume for the night to 60 loads, or 370 tons, 1760 lb. The mileage for the night trips was 46 miles, or four-fifths of a mile per trip.

Ohio Wage Scale

The latest information from Ohio is to the effect that on July 1, the operators and miners in the Hocking Valley, Pomeroy, Jackson and Crooksville districts were still negotiating. The miners cut their offer of 49.64c. for machine coal on the mine-run basis to 47c. The operators held firmly to 44.61c. Adjournment was taken till the following morning, both sides being optimistic of an early settlement.

Interesting Articles Next Week

We have found it impossible to crowd all the coke articles prepared for this special number in our issue this week. As a consequence, succeeding numbers of COAL AGE will contain various articles covering many other interesting problems pertaining to the manufacture of coke. In addition we will continue the series of articles on "The Use of Electricity in Coal Mining." Still another article we will publish next week, describes in great detail, "Indiana's First Electrically Operated Coal Mine."

Extracts from a Superintendent's Diary

When we abolished the saloon from our camp, we hoped that one kind of family discord would be abolished with it, but we were mistaken. Apparently we'll have to abolish a certain few of our families before we can achieve so desirable a condition.

Take old John Ross for example: Every pay-day since the saloon was outlawed, John has sneaked off to the city, urged on by terrible thirst, and returned with the thirst quenched, but with fists and tongue active.

Sometimes the grand finale came at ten and sometimes at twelve o'clock the same night, but, aside from the time element, there is little variation. His wife calls in the neighbors just in time to prevent a knock-out blow, and the day following Tom awakes somewhere near noon, quite unconscious of all the commotion he has originated and proceeds to bathe the swollen eyes of his wife, the while he vows that he has forever sworn off.

Yesterday being pay-day, I decided to assist Tom's wife, and so, when I saw Tom sneaking off, I hailed him and reminded him that his little five-year-old (Harry) had been promised new shoes with blue kid tops, and that, according to promise, Harry should be taken to town and thus be assured a perfect fit.

I make no claim to the scheme; it was furnished me by Tom's wife. Here is how it worked out:

At six o'clock Tom returned as usual on the local, accompanied by his usual jag, but Harry was nowhere to be found. The more we questioned Tom, the less we knew, and so in disgust we hurried him off to bed and began to search out all of the others who had been to town and had noticed Tom during the day.

By plotting all the facts (during all this time, while we were gathering the news, the entire camp was in an uproar; some wanted to lynch Tom, others wanted to hire a special and go to the city in search of Harry, while still others routed the telegraph operator out of bed and got busy with the wires), we learned that by ten o'clock Tom had purchased the shoes and he and Harry had been seen marching up and down, quite after the approved manner of father and son. By twelve o'clock Harry had been left in the waiting-room of the station while Tom went out to purchase a lunch; by two o'clock Harry had considered himself deserted and had been seen by several at the station, in very great distress; that was the last dope on Harry.

Tom had been found sleeping in an alley by a policeman, at about ten minutes before leaving time for the local, and had been hustled aboard by the policeman and several of our miners who happened along. None of these particular miners had recalled that Harry had accompanied his father in the morning, and so made no inquiry.

About twelve o'clock Mrs. Tom came down and plainly told me what she thought of me for allowing a man like Tom to take off her child without having someone made responsible for his return. That settled the matter! It was up to me to return Harry. I promptly got in touch with the city police department by long-distance 'phone. Yes; there was a little boy who had said that his name was Harry, now sound asleep in the chief's office, and in one hand he still held on to two little blue top shoes.

Perhaps, because of the fact that Mrs. Tom does our family sewing, Mr. Tom and his family won't be abolished forthwith.

Legal Department

Recent Decisions

BY A. L. H. STREET*

Corporation's Lien on Shares of Stock—The provisions of the Arkansas statutes which give a lien in favor of a corporation on stock, to secure payment of debts due the company from the holder of the stock, extends only to debts which are actually due, and not to unmatured obligations. (Arkansas Supreme Court, Young Coal Co. vs. Hill, 165 Southwestern Reporter 292.)

When Employer is Not Responsible for Defective Condition—A coal company is not liable for injury to an employee resulting from a defective condition in ways or machinery, unless negligence is attributable to the company in the matter of permitting the defective condition to arise or continue. (Alabama Supreme Court, Epsey vs. Canaba Coal Co., 64 Southern Reporter 753.)

Injury Caused by Falling Slate—A coal-mining company is liable for injury to a member of a timbering crew caused by falling slate, if his foreman, after making an investigation, directed him to continue work, and if there was no such obvious danger as would have justified the injured employee in refusing to proceed. (Kentucky Court of Appeals, Bracken vs. Lam Coal Co., 165 Southwestern Reporter 686.)

When Seller Need Not Tender Delivery—If a contract for a sale of coal for monthly deliveries obligates the buyer to order approximately a certain tonnage each month, the seller is not bound to tender that amount before he can recover damages for the buyer's failure to order the specified amounts. (United States Circuit Court of Appeals, Seventh Circuit; Alwart Bros. Coal Co. vs. Royal Colliery Co.; 211 Federal Reporter, 313.)

Damages for Delay in Constructing Coal Handling Apparatus—When a contractor for the construction of a coal-hoisting tower inexcusably fails to complete the work by the time agreed upon, damages are recoverable against him for loss of economic operation during the period of such delay, together with interest on that amount. (Massachusetts Supreme Judicial Court, C. W. Hunt Co. vs. Boston Elevated Ry. Co., 104 Northeastern Reporter, 728.)

Duty to Warn Employee of Danger—A coal company is liable for injury to an employee, caused by sudden starting of a wheel upon which he was assisting in adjusting a belt, if the company's represenatives failed to warn him of dangers which he could not readily appreciate, or if they failed to use reasonable care to safeguard him against the accident. (United States Circuit Court of Appeals, Third Circuit; Valley Camp Coal Co. vs. Kucewicz; 211 Federal Reporter 953.)

Recovery of Freight Overcharges—In a suit to recover from a railway company the excess of freight charges collected on coal shipments above reasonable charges, a shipper is entitled to show rates charged on shipments originating at the same points and hauled through the destination to other points, and, also, what rates are usually charged for hauling coal like distances under similar conditions. (Colorado Supreme Court, Kindel vs. Colorado & Southern Ry. Co., 139 Pacific Reporter 1105.)

Validity of Agreement for Payment to Shipper—An agreement by a railway company to pay a shipper 20c. per ton for "spotting" cars on the shipper's tracks in its own yards, is invalid under the Interstate Commerce Act, as amounting to a contract for an unlawful rebate. This charge cannot be sustained as a terminal charge, if it has never been published as such, as required by the Act. (New York Supreme Court, N. Y. Central & H. R. R.R. Co. vs. General Electric Co., 146 New York Supplement 322.)

Duty of Railway Company to Continue Switching Service—The fact that a shipper has denied liability for demurrage charges sought to be collected by a railway company is no excuse for discontinuance of switching service previously afforded him on a private track. He is entitled to sue to enjoin the company from wrongfully discontinuing the service, if discontinuance would seriously impair his business. If a railway company knows in advance that a consignee will not accept delivery of freight on a certain track and he is entitled to delivery elsewhere, demurrage charges cannot be based upon a delivery there. (Tennessee Supreme Court, Dunlap Lumber Co. vs. Nashville, Chattanooga & St. Louis Ry. Co., 165 Southwestern Reporter 224.)

Reasonableness of Freight Rates—The finding of the Interstate Commerce Commission as to the reasonableness, or otherwise, of a rate charged by a carrier in interstate commerce, is an administrative function properly delegated to the Commission, and is, if lawfully made, conclusive. If such finding of the Commission is, that a given rate is unreasonable, it is as if the unreasonableness of such rate were fixed by statute, so far as future charges are concerned. But such finding, although possessing evidential value, is not conclusive nor even prima facie evidence of the reasonableness of a rate in a suit brought by a shipper for damages sustained by him on account of excessive charges. (United States Circuit Court of Appeals, Third Circuit; Lehigh Valley R.R. Co. vs. Meeker, 211 Federal Reporter 785.)

Liability for Mine-Foreman's Negligence—Injury by Explosion—A mine foreman employed under the Pennsylvania laws may be engaged by the operator to perform service beyond his statutory duties, and the operator is liable for negligence in the manner in which he performs such outside duties. Plaintiff, a miner, inserted charges of explosive in coal in the wall of a chamber on assurance from a superior that, though the explosive was damp, it was safe for use. The charges, however, did not explode when set off nor when new charges were inserted near them. In striking a large mass of coal broken down by the second charges, one of the first charges was exploded by plaintiff's pick with the result that he was injured. Held, that the operator was liable for the injury sustained. (United States District Court, Southern District of New York; Calausky vs. Lehigh Valley Coal Co.; 212 Federal Reporter 304.)

Safety of Miner's Place of Work—An employer's failure to use a proper degree of care to furnish a safe place of work for his employees may be established by circumstantial evidence. "A miner who had just been employed by a coal company was directed to begin work in a room of a coal mine in which mining had been done a few days before. He drained out some of the water and cleared away débris, and then began to pick coal, and after he had been at work for about five minutes his pick struck an unexploded charge of an explosive that had been left in the coal, which caused an explosion that seriously injured him. It was held, that the explosion and the attendant circumstances are prima facie proof that the company failed to perform its absolute duty of furnishing the miner a safe place to work, and also that the miner was free from contributory negligence." (Kansas Supreme Court, Broseghini vs. Sheridan Coal Co., 139 Pacific Reporter 1025.)

Penalty for Mining Coal Near Boundary Line—Suit brought under the West Virginia statutes to recover a $500 penalty from a coal company for mining coal within 5 ft. of a line dividing adjoining coal lands must be instituted within one year after the penalty accrues. Such a company is liable for the acts of its employees in violating the statute without regard to whether the company authorized the violation. "The mere fact that the corporation had a general uninforced policy against violating the statute does not absolve it. * * * Those in charge of a mine for a corporation must see that the statute against mining within 5 ft. of a division line is observed, otherwise the corporation itself is liable for the penalty. The neglect, mistake, or disobedience of its servants in this particular will not excuse it. In this day of accurate civil engineering and efficiency organization there can be no neglect, mistake, or disobedience of the company's servants in violating the statute, but that for which the company itself is reasonably chargeable. A failure on the part of the corporation to see that its servants obey the statute, is its own nonobservance of the statute. A coal company cannot say that it notified its mine management to observe the property line and therefore is not responsible for the violation of the statute If this were so, there could be no enforcement of the statute under its terms. The act of the management and servants at the mine in such a particular is the act of the corporation without other proof of authority or approval." (West Virginia Supreme Court of Appeals, Gawthrop vs Fairmont Coal Co., 81 Southeastern Reporter 560.)

*Attorney-at-law, 317 Commercial Bldg., St. Paul, Minn.

The Human Element in Coal Mining

By George N. Griffin*

During recent years much thought and attention have been given to the conditions of coal-mining camps as matters of consideration apart from the actual working conditions of the mine itself, and its immediate surroundings. Mining companies are realizing that many conditions are in existence in the various coal camps, which, to a great extent, make or mar the plant as a whole.

It is realized, of course, that a coal mine is opened as any other industrial enterprise is started, primarily for the purpose of getting a fair return for the money invested; hence the further fact must be acknowledged that unless such enterprises can be made to earn a fair return they cannot be kept in operation, as none of us relish the idea of investing money at a loss.

While this is true, yet I believe that several improvements can be made in many coal-mining camps and villages, which, though they call for the investment of much capital, will, indirectly, bring adequate returns to the plant as a whole.

Better Mining Towns Needed

First, I would mention suitable and comfortable dwellings for the employees; such as can be rented at a reasonable figure. Most of us have heard of houses which have been equipped with all the modern conveniences, such as electric lights, bath, toilets, etc., only to find that some of the tenants have used the bathtub as a receptacle for wood or coal or some of the other paraphernalia of housekeeping. This may be true in a few isolated cases, but usually good, comfortable dwellings are appreciated by the average mine worker.

It is true, though, that in some cases tenants will leave good houses owned by a company, to live in mere shacks for the sake of economy. Many of such shacks, if owned by a company, would be declared unfit for human habitation. Such people as these need educating up to a higher standard of living, and I think this is gradually being done. This is especially true of the rising generation, the members of which are rapidly assimilating American ideas of the correct standard of living. It would be well, also, if all coal companies (as some do) would take more interest in religious, educational and all other matters pertaining to better living conditions. It is a common practice on the part of many writers on life in mining camps to denounce conditions as altogether bad. That there is some truth in the statement that they are not what they should be, we all must admit, but it will not be so, if the same attention is paid to the educational, religious and amusement features, as is given in the average town.

The Employment of Idle Time

The great trouble, as I see it, is that frequently the only place to which the men can go except to their homes after the day's work is done, is the saloon with its attendant evils. Coal companies, I think, are beginning to realize that the intemperate habits of their employees are costing them much money.

To offset this, encouragement ought to be given to all kinds of healthy amusements and entertainments, such as baseball, football, picture shows, lectures on first-aid work, etc. A good game of football or baseball is much better for our men and boys than hanging around questionable places; hence a playground ought to be furnished, if possible. Much good can be accomplished if the fathers and mothers can be induced to keep in close touch with the school. This can be done by visiting the classes frequently, encouraging the teachers in their work and incidentally stimulating the children in their studies. By these visits the officials of the mining company will, also, be able to judge, to a certain extent at least, as to the ability of the teachers.

In all this work, great care must be taken to avoid the appearance of patronage, for the average workman detests being treated with condescension. In attempting to do these things, one of the most important matters is to secure the coöperation of the residents of all places where such work is undertaken. This includes the wives and children of the employees. If such coöperation can be secured, the sociological work will be made much easier, for the reason that all will feel that it is their job.

The bravery displayed at numerous tragedies with which mining centers have been afflicted, goes to prove that many unselfish, heroic souls are hidden behind grimy faces. Acts of heroism are being performed day by day that cannot be surpassed in any other department of human activity, war even included. Such material as this ought not to be neglected for we are quite sure that any uplift work expended will get its reward in a higher plane of living on the part of the residents of such camps. And as a byproduct, companies will get more intelligent and better service as a financial return for their additional investment.

*Mining superintendent, Republic Coal Co., Roundup, Mont.

Convention of American Peat Society

The eighth annual convention will meet at Duluth, Minn., Aug. 20 to 22, 1914. Experts of international renown on the commercial uses of peat lands and the reclamation of swamp lands will address the convention. The itinerary of the delegates, of whom more than 100 are expected, includes a trip over the Mesaba Range by special train as guests of the Duluth, Missabe & Northern Ry. and the Duluth & Iron Range Ry., auto rides about the city of Duluth, and a trip of inspection through the Minnesota Steel Co.'s new plant on the St. Louis River above Duluth. This will be the first convention at which the European countries will be represented. Among those scheduled to address the gathering are: C. L. Wood, of Stockton-on-Tees, England; Thomas Tomlinson, a well known engineer of Dublin, Ireland, who will discuss Ireland's peat bogs; K. Lubkowski, of Warsaw, Poland, who will talk on Russian peat deposits; Dr. Joseph Hyde Pratt, state geologist of North Carolina; Charles A. Davis, peat expert of the U. S. Bureau of Mines, who has made a special study of Mesaba Range formations; Dr. F. V. Coville, of the U. S. Bureau of Plant Industry; Robt. Blei, of Sacramento, Calif.; John Wiedmer, of St. Louis, Mo.; Dean A. F. Woods, of the University of Minnesota; W. H. Emmons, State Geologist, and other state and national officials. On account of its international character, the convention is receiving much attention from Duluth and Mesaba Range engineers and professional men.

It is contended that producer gas provides a more satisfactory means of transmitting heat through an extensive plant than steam. The mains are probably less costly, and there are no losses corresponding with steam condensation, while for furnace work, high temperature and evaporating, it offers great convenience and an all-round economy which might be set down as equal to 30 per cent., over the direct burning of coal under such apparatus. In plants spread over a large area, gas can advantageously be carried to isolated gas engines, which, unlike steam engines, do not fall off in efficiency in the small sizes.

Discussion By Readers

A Longwall Proposition

Letter No. 4—The discussion of the proposition, submitted by H. R. Hartsuff, COAL AGE, June 6, p. 944, relating to the adoption of the longwall system of mining, should prove of interest, not only by way of determining whether the longwall method of mining is applicable under the conditions cited, but also by the comparison it suggests of the two general systems of mining, with respect to the safe and economic extraction of the coal.

Personally, I do not consider the conditions submitted by Mr. Hartsuff as favoring the adoption of longwall mining for the following reasons:

1. Longwall mining depends on three essential conditions; namely, (a) a hard bottom; (b) a pliable or yielding rather than a brittle roof; (c) a thin seam not exceeding 4 ft. in thickness, lying flat or but slightly inclined, at some considerable depth below the surface and free from faults or other troubles. The conditions last mentioned are the only ones that appear to be fulfilled in the present case.

2. In the application of the longwall method, in the present instance, disintegration of the fireclay bottom can reasonably be expected to take place over a large area of extraction. This disintegration would be more rapid in the roadways where the bottom is already broken, with the result that the roadside packs would be weakened and demolished very rapidly over the entire mine.

3. Under the conditions cited, the roof slate, varying from 4 to 10 ft. in thickness, would be the first affected by the extraction of the coal. This slate would settle away from the hard rock above and its weight would rest heavily on the packs and cause them to subside more rapidly. But the greatest danger would be experienced when a sufficient area has been mined to cause a break in the sulphur binder above. This break would be sudden, and the force of the impact when this overburden dropped through the few inches of space intervening between the roof slate resting on the packs and the rock above would undoubtedly be disastrous.

4. If the seam is gaseous, another danger would be presented by the accumulation of gas in the void space formed by the settling away of the roof slate from the overlying rock. This space would form a very convenient reservoir for the accumulation of dangerous gases. By the breaking of the rock strata above, the gas would be driven out forcibly into the mine workings, increasing the danger of the situation tenfold.

5. The cantilever action of the unbroken roof would cause an excessive pressure to be thrown on the coal face, which, owing to the large leverage, would be productive of grave danger unless successfully controlled.

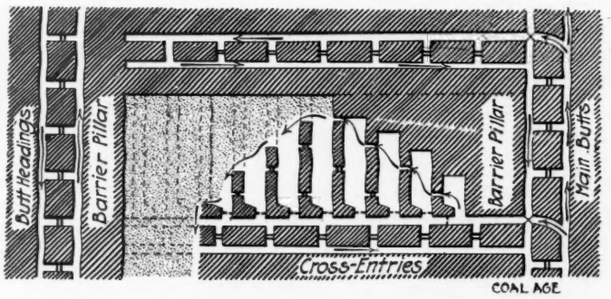
The method of mining this seam, as described by Mr. Hartsuff, is an antiquated one. My experience as a miner in the northern bituminous coal field, where this method has been in operation for a period of about 80 years, leads me to conclude that it is not applicable to the mining of coal under any conditions. When compared with the room-and-pillar system of mining, the defects of the method become very prominent, the most important being: (a) Ineffectual ventilation; (b) the loss of a large percentage of coal.

I have come to regard the two general systems of mining—the room-and-pillar and the longwall system—as being sequential. In my opinion, the room-and-pillar system stands first and is adapted, either advancing or retreating, to any conditions where the coal seam does not lie at such a depth below the surface that the required width of room pillars is such as to restrict the rooms to the dimensions of entries. Before this condition is reached, the longwall system may be adopted, chiefly for monetary or economic reasons.

I would not adopt or advise the adoption of the longwall advancing method. While, for a time, it may possess advantages over the retreating method, these are soon superseded by the disadvantages that develop as the work progresses.

Referring, again, to the case in hand, I would make the following suggestions:

1. Make no change in the entry development.
2. Drive single rooms and proportion the width of



SHOWING PANEL WORKED ON RETREATING PLAN

room to width of pillar, having due regard to the depth of cover, thickness of seam, character of roof, floor and coal, which elements practically determine this ratio.

3. As indicated in the accompanying diagram, drive the cross-entries only to the barrier pillar flanking the next pair of main entries, or butt headings; and make this barrier pillar of such width as to protect those headings from any danger of squeeze.

4. As each pair of cross-entries reaches the barrier pillar, start to turn rooms on the rise side of the entries, at the inby end; and work out the coal in this panel on the retreating plan. (This is a modified panel system of mining.)

In closing, let me say that I have seen this method in operation in a seam almost identical with that described by Mr. Hartsuff, except that there was an overburden of from 400 to 600 ft. The mine was operated with entire safety, and little trouble or expense was incurred from squeeze in the mine.

I. C. PARFITT.

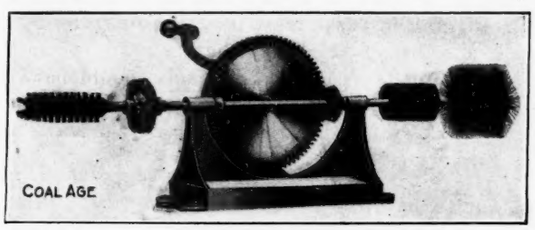
Jerome, Penn.

Cleaning Safety-Lamp Gauzes

Referring to the inquiry from Johnstown, COAL AGE, June 20, p. 1024, I note a contributor asks for a "cheap and convenient method" for cleaning safety-lamp gauzes, so as to do the work effectively and avoid the installation of "a special machine for that purpose."

I have found, by long acquaintance with the work, that the statements made by this inquirer are correct. He states: "The usual method of cleaning the gauzes of a large number of safety lamps, especially where two gauzes are used in each lamp, consumes much time and is often imperfectly done. Without a close inspection of each gauze, it is difficult to detect when this work has been slighted."

While a number of machines have been designed and constructed for cleaning safety-lamp gauzes, I have found



A CHEAP AND EFFECTIVE MACHINE FOR CLEANING SAFETY-LAMP GAUZES

that the cheapest machine doing effective work of this kind is that illustrated in the accompanying figure. This machine is shown as being operated by hand; but, if desired, it can be readily mounted to be operated by power. I believe it has been found to do effective work wherever it has been employed. The same machine has been used to clean the glass chimneys of the lamps, as well as the wire gauzes. It is a great improvement over the common hand brush used for that purpose; and for this reason, I have suggested its use, for the benefit of the readers of COAL AGE.

G. A. C.

New York City.

Working Coal Seam with Heavy Parting

Letter No. 1—The question as to whether it would be profitable to work a 5-ft. coal seam with a heavy parting, depends to a very large extent on the market conditions and the competition with coal that can be more economically mined. If this competition is keen, it is possible that the seam in question cannot be worked with a profit. But if there is a fair margin between the market prices and the operating costs of the competing coals, it should be quite feasible to operate in this seam profitably; especially as the coal is said to be of a better quality than other coals in the district. It should be possible, also, to get a larger percentage of lump coal, than would usually be obtained from working a 5-ft. seam.

I have had a long experience in the longwall method of working, and, unless there are reasons, not stated, that would prevent, I would strongly recommend its adoption, for the following reasons: Yardage is eliminated; a maximum recovery of coal is obtained, which is an important factor in the working of a thin seam; the longwall method of working is more favorable to machine mining; ample space is available for stowing the waste from the thick parting; a larger percentage of lump coal will be obtained; ventilation is simplified; and supervision is easier.

The mining should be done in the parting, which should all be removed and stowed away before the coal is mined, in order to insure loading only clean coal. There are several methods by which the mining may be done and the best can probably only be determined by experiment. Machines that will undercut in the vein above the floor level can be used; or, by keeping the face of the upper bench of coal always in advance, an ordinary longwall machine can be used to mine either in the top or bottom of the parting, using the lower bench of coal for the floor. The remainder of the parting not cut out by the machine must be removed by shooting or by a hand pick. A few light shots should do the work. Another method that might be employed would be to cut out the parting with punching machines. It is necessary to mine in the parting, however, as it would be found to be impossible to separate the dirt and load clean coal if both were shot down together.

By the longwall method of working, the weight of the roof can be utilized to assist in bringing down the top coal, and but little powder will be required either for this work or in blasting out the bottom bench. A large proportion of lump should be obtained, especially as the mining is done in the parting, and no slack coal should be produced by this plan.

The parting will be used to make the packs, which must be built solidly; and, in order to do this, some large pieces will be needed to face up the packwalls. If these are not available from the parting, they must be obtained from the roof, which should break down in the waste spaces between the packs and thus relieve the face of some of the roof pressure. Some timber will be needed at the longwall face; but these props can be drawn and used over again as the face advances and the packwalls are built.

Not knowing the exact working conditions and the scale of wages, it is impossible to estimate with any certainty, the cost of mining this coal; but it should not exceed by 10c. per ton, the cost of mining a 5-ft. seam of coal under similar conditions but without the dirt parting. This additional cost would be partially, if not altogether, offset by the superior quality of the coal and the larger percentage of lump that will be produced.

C. V. GOULD,
Mining Engineer.

Salt Lake City, Utah.

Letter No. 2—Referring to the inquiry in regard to working a seam of coal 5 ft. thick with from 6 to 18 in. of parting in the middle of the seam, much will depend on the conditions. However, it may be stated, in a general way, that in order to insure good drainage in the mine, it is important to reach the lowest point of the seam and work toward the rise. By so doing the face of the workings will be generally dry.

If the mine is not already opened, the plan should be drawn on the triple-entry system. Cross-entries should be turned off the main road 600 ft. apart. Double rooms, 40 ft. wide, should be turned off on each side of the cross-entries and driven 300 ft. These rooms should be driven

on 70-ft. centers so as to provide a 30-ft. pillar between adjoining rooms. Tracks should be laid on each side of the rooms next to the rib or pillar. The cross-entries should be driven on 60-ft. centers so as to provide a good width of entry pillar, to avoid the danger of a squeeze, cutting off the roadways. As each room reaches the limit the pillars should be drawn back, in regular order. There will be plenty of space in these wide rooms for stowing the waste of the parting in the seam.

I am satisfied that this coal can be worked profitably, providing the parting can be cut with mining machines and provided there is a good market for the coal. Allowing 25c. per ton for loading the coal into the mine cars, 7c. per ton for machine cutting and 7c. per ton of coal for stowing away the slate and waste of the parting, would make the cost of coal loaded in the cars and ready to be hauled out of the mine, 39c. per ton. To this it will be necessary to add 10c. per ton for hauling and loading the coal into the railroad cars and, say 5c. per ton for royalty and 16c. per ton for other expenditures, such as rails, ties, posts and cap-pieces. This will make the total cost of the coal loaded on the railroad cars 70c. per ton, which I believe is possible under ordinary conditions of mining such a seam.

There being a large percentage of sulphur in this coal (3.73 per cent.), it will be necessary to take extra precautions, in the development of the mine, to avoid spontaneous combustion and gob fires. It is important to load out all the fine coal and slack produced and not permit this to be thrown into the gob. The time to take these precautions is when the mine is first opened out. It is less trouble to start right than to overcome the difficulties resulting later, in the development of a mine subject to frequent gob fires.

Should the plan I have suggested not prove successful, a change can be made to the longwall system of mining, with little or no extra cost. The longwall method, it is true, affords plenty of space for stowing away the waste material and yields a large recovery of the coal. In this system, the stalls or roads should be turned from 200 to 300 ft. apart. It will be necessary to shoot down the top over the roadways to provide sufficient headroom. This material can be used for building the roadpacks, which should be from 10 to 12 ft. in width on each side of the road. These packs must be well built in order to maintain a sufficient height in the roadways when the weight comes on the packs. The roads should be wide enough to allow a little room to stow any slate that may fall in the roads later; but this will not be much if the roof is good, as stated.

SAMSON SMITH.

Mineral, Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Operation in Proportion—In any proportion expressing the equality of two or more ratios, there is usually one unknown term whose value is to be determined from the combined values of all the other terms. To ascertain the value of the unknown term **x**, write the couplet containing it as the second member of the proportion and the remaining couplet or couplets as the first member.

Observe carefully to write each couplet as a direct ratio when it increases or decreases in the same order as does the unknown ratio. If, however, an increase of the former causes a decrease of the latter or vice versa, the couplet must be written as an inverse ratio. The following example will serve to make this clear.

Example—If six miners load 200 tons of coal in 10 days, working 8 hr. a day; in how many days will five miners load 300 tons, working 9 hr. a day?

Solution—There are clearly four ratios in this question, including eight terms of which one is unknown and must be designated by **x**. The ratio of the miners is 6:5; the tonnage, 200:300; the days of work 10:**x**, and the hours per day 8:9. These are all direct ratios, as they compare the first case mentioned, with the second, in the same order as that of the unknown ratio containing **x**.

The first step after finding these ratios, is to write the one containing the unknown term **x**, as the second member of the proportion; thus,

$$\text{—} : \text{—} :: 10 : x$$

Now, consider the miners as compared with the number of days they work. It is evident the more men employed, the less time will be required to do the work. Hence, this first couplet must be written as an inverse ratio: 5:6.

Next, considering the tonnage, it is clear that the more coal to be loaded, the more time will be required; and the tonnage is expressed, therefore, as a direct ratio, which is 200:300.

Again, in regard to the last ratio, it is certain that the longer the working day, the less will be the number of days required to finish the work. This is, therefore, an inverse ratio, namely, 9:8.

Writing these ratios, then, as a compound proportion,

$$\begin{matrix} 5 & : & 6 \\ 200 & : & 300 \\ 9 & : & 8 \end{matrix} :: 10 : x$$

The **rule of proportion** makes the product of the means equal to the product of the extremes. The value of the unknown term **x** is, therefore, found by dividing the product of the means, by the product of the known extremes, which are the antecedents of the couplets in the first member of the proportion. The method of cancellation simplifies the work; thus:

$$x = \frac{\overset{2}{\cancel{6}} \times \overset{1}{\cancel{300}} \times 8 \times \overset{2}{\cancel{10}}}{\underset{1}{\cancel{5}} \times \underset{1}{\cancel{200}} \times \underset{3}{\cancel{9}}} = 16 \text{ days}$$

The Coal Age Pocket Book

INVOLUTION

The word "involution" means a rolling up or involving. As applied to numbers, it means the process of multiplying a number by itself any given number of times. In other words, the number is taken so many times as a factor; and the resulting product is called the first, second, third, etc., **power** of the number according to the number of factors taken.

Powers of Numbers—The required power of a number is indicated by writing a small figure expressing such power, at the right and slightly above the number. The small figure is called an **"exponent"** or the **"index"** of the power.

The first power of a number is always the number itself. The second power is commonly called the **"square"** and the third power the **"cube"** of the number..

The following examples will serve to illustrate the process of finding the indicated power of any number; as 3, for example:

First power	$3^1 = 3$	$= 3$
Second power,	$3^2 = 3 \times 3$	$= 9$
Third power,	$3^3 = 3 \times 3 \times 3$	$= 27$
Fourth power,	$3^4 = 3 \times 3 \times 3 \times 3$	$= 81$
Fifth power,	$3^5 = 3 \times 3 \times 3 \times 3 \times 3$	$= 243$

The process of involution is thus seen to be that of a continuous multiplication of a number into itself, the resulting product being the power sought, such power being indicated by the number of factors employed. For the sake of ready reference, the squares and cubes of numbers from 1 to 1000, together with their square roots and reciprocals are given in the "Useful Tables for Engineers and Students."

Important—To shorten and simplify numerical calculations in involution it is well to note the following:

1. To find any power of a number having one or more ciphers at the end; discard the ciphers and find the required power of the number so diminished. To that result annex as many ciphers as the number discarded multiplied by the index of the power.

Thus, to cube 600, proceed as follows:

$$6^3 = 6 \times 6 \times 6 = 216.$$

To this annex, $2 \times 3 = 6$ ciphers; hence $600^3 = 216{,}000{,}000$

2. To find any power of a decimal, find the required power of the number, discarding the decimal point; and, in the result, point off as many decimal places as those in the original number multiplied by the index of the power.

Thus, to cube 0.4, proceed as follows:

$$4^3 = 4 \times 4 \times 4 = 64.$$

Then, point off $3 \times 1 = 3$ decimal places; hence, $0.4^3 = 0.064$.

3. The power of a number is equal to the product of two powers of that number, such that the sum of their indices is equal to the index of the original required power. For example, the fifth power of a number is equal to the product of the square and the cube of the number.

$$3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$$

or

$$3^5 = 3^2 \times 3^3 = 9 \times 27 = 243.$$

Inquiries of General Interest

How to Buy Coal

Last year we purchased coal for the plants, at a contract price of $2.05 per net ton delivered. The contract for the purchase of this coal was based on the following proximate analysis:

	Percentage
Moisture	0.64
Volatile matter	39.07
Fixed carbon	55.14
Ash	5.15
Total	100.00
Sulphur	1.05 per cent.
Heat units	14,510 B.t.u.

During the year, we had two samples of this coal analyzed for our own satisfaction. Each of these analyses showed considerably less combustible matter and a far greater percentage of ash and sulphur than the original analysis on which the contract was made for the purchase of the coal. These two analyses also showed a much less heat value (B.t.u.) than the previous analysis. The samples for analysis were taken from two separate cars, at different times during the year. They are as follows:

	Percentage
Moisture	1.21
Volatile matter	34.39
Fixed carbon	52.51
Ash	11.89
Total	100.00
Sulphur	2.04 per cent.
Heat units	13,347 B.t.u.

The above sample was taken from Car 62,462. Another sample taken from Car 72,494 gave the following analysis:

	Percentage
Moisture	0.90
Volatile matter	28.00
Fixed carbon	52.58
Ash	18.52
Total	100.00
Sulphur	7.73 per cent.
Heat units	11,760 B.t.u.

Prior to last year, we had used only Pittsburgh district coal, which was purchased at a contract price of $2.40 per net ton, delivered. This coal gave a proximate analysis as follows:

	Percentage
Moisture	1.70
Volatile matter	31.80
Fixed carbon	60.10
Ash	6.40
Total	100.00
Sulphur	0.84 per cent.
Heat units	13,480 B.t.u.

A brief calculation of the cost of heat units, under last year's contract, as compared with the same item under the contract of previous years, shows that each cent expended for fuel, purchased 141,560 B.t.u., this calculation being based on the contract analysis of the coal first above given; while each cent of outlay in previous years purchased only 112,333 B.t.u. The increase in B.t.u., in favor of last year's contract, is thus 29,227 B.t.u. for each cent of outlay; or 26 per cent. of gain over the contract price of previous years. To offset this reduction in the price of coal, however, an examination of the records for the year shows that a considerably larger amount of coal was used during last year than in any year previous.

The question I desire to ask is whether the reduction in the price of the coal, on a heat-unit basis, justified last year's contract of purchase, judging from the first analysis submitted above as compared with the last analysis given, under which coal had been purchased in previous years. Kindly advise what factors of the analysis enter into such a comparison and determine the superior qualities of the coal for fuel purposes.

J. A. Flood,
Sec'y., Venango Mfg. Co.
Franklin, Penn.

The purchase of coal, in respect to economy of operation, can only be determined by a careful consideration of the requirements. It is not wholly a question of the cost of heat units, as the cheaper coal, on this basis, may contain impurities that cannot be permitted or that would forbid its use for the purpose intended.

There are certain limitations to the allowable percentages of the sulphur and ash shown in the proximate analysis of a coal intended for many purposes; while, for most fuel purposes, there are limits to the allowable percentage of bone or slate. Again, the hardness, weathering qualities, disposition to heat in bunkers, and similar characteristics, must be considered. In practice, the flaming quality of coals is often an important factor and determines or limits the adaptation of a particular coal for use under certain types of boilers.

The fact that a much larger amount of coal was used last year, in the operation of this plant, of itself proves nothing, since a larger amount of work may have been done, for which greater horsepower would be required. However, it is plainly evident that the two analyses made during the year compare very unfavorably with the contract analysis first given, both in the decrease of combustible matter they show and the increase of impurities in the coal. It is possible, however, that the two analyses made during the year were not representative of the coal used.

The sampling of coal for purpose of analysis is a most important item in the determination of the value of the coal. The analysis of samples of coal taken from the same car will often vary very widely, in the percentage of volatile matter shown and more especially in the percentage of impurities present. For this reason, it is never safe to rely on one or two analyses; but numerous samples and analyses should be taken, the average of which will generally represent more closely the quality of the coal delivered.

In this connection, we would draw attention to two interesting letters on the subject, "How to Buy Coal," Coal Age, Vol. 4, p. 866; and Vol. 5, p. 296. We hope that this important question will be taken up and further discussed by those whose experience in the purchase of coal for fuel makes their remarks of value to the producer and consumer alike.

Examination Questions

Mine Managers' Examination Held at Springfield, Ill. June 15, 1914

Ques.—If 50,000 cu.ft. of air is produced by a given power, in a circular airway 12 ft. in diameter, what quantity will the same power pass in an airway of the same length, 8 ft. in diameter?

Ans.—In this case, the airways being circular are similar. Then, the length of the airways being equal and the power constant, the quantity of air in circulation varies as the cube root of the fifth power of the diameter of the airways. In other words, the quantity ratio is equal to the cube root of the fifth power of the diameter ratio. Therefore, calling the required quantity of air circulated in the 8-ft. airway x, the power being the same in both airways, we have:

$$\frac{x}{50{,}000} = \sqrt[3]{\left(\frac{8}{12}\right)^5} = \sqrt[3]{\left(\frac{2}{3}\right)^5} = \sqrt[3]{0.1317} = 0.508$$

$$x = 50{,}000 \times 0.508 = 25{,}400 \textit{ cu.ft. per min.}$$

Ques.—An airway 60 yd. long, 5 ft. high and 8 ft. wide is full of firedamp. What quantity of air must be added (a) to render this quantity of gas explosive; (b) to make it reach the maximum explosive point; (c) to so dilute the gas as to render it nonexplosive?

Ans.—The cubic capacity of this airway is 3x60x (6x8) = 8640 cu.ft. The term "firedamp" refers to an *inflammable* or *explosive* mixture of air and gas; marsh gas (CH_4) undiluted with air is not firedamp, as it is an extinctive gas and not explosive. Assuming, however, that the meaning of the question is that this entry is full of marsh gas, and taking the volume of this gas as 8640 cu.ft.; (a) if air be added, the mixture will first become explosive when the proportion of gas to air is 1 : 5, assuming no other gas or dust is present. The required volume of air to produce this result is, therefore, $5 \times 8640 = 43{,}200$ cu.ft.

(b) The maximum explosive point, under the same conditions, is reached when the proportion of gas to air is 1 : 9.57. The required volume of air, in this case, is therefore $9.57 \times 8640 = 82{,}680$ cu.ft.

(c) Under the same conditions, the firedamp mixture becomes nonexplosive when the proportion of gas to air is 1 : 13. The required volume of air, in this case, is therefore $13 \times 8640 = 112{,}320$ cu.ft.

Ques.—If the total air pressure upon a ventilation door is 400 lb. when the water gage is 2½ in., what is the area of the door on which this pressure is exerted; and what is the height of the door when its breadth is 5.5 ft.?

Ans.—Assuming the given water-gage reading is taken on the door, the indicated difference of pressure between the two sides of the door is $2.5 \times 5.2 = 13$ lb. per sq.ft. If the total pressure exerted on the door is 400 lb., the area pressed is $400 \div 13 = 30.77$ sq.ft. The height of the door is, therefore, $30.77 \div 5.5 = 5.59$, say 5 ft. 7 in.

Ques.—Of two airways of equal length, which will pass the greater quantity of air under the same pressure; one of these airways is 8x8 ft. in section, and the other 4x16 ft. in section? Give the reasons for your answer.

Ans.—These airways have the same sectional area (64 sq.ft.), and their lengths being equal, the quantity of air in circulation under the same pressure varies inversely as the square root of the perimeter of the airways. In other words, the quantity ratio is equal to the square root of the inverse perimeter ratio. The perimeter of the first airway, which is square, is $4 \times 8 = 32$ ft.; and that of the second airway, $2(4 + 16) = 40$ ft.; and the ratio of the quantities of air passing in these airways is therefore:

$$\frac{q_2}{q_1} = \sqrt{\frac{o_1}{o_2}} = \sqrt{\frac{32}{40}} = \sqrt{\frac{4}{5}} = \sqrt{0.8} = 0.894$$

The ratio of air passing in the first airway to that in the second airway is, therefore, 1 : 0.894; or, for every 1000 cu.ft. of air passing in the first airway there is 894 cu.ft. passing in the second airway, under the same pressure.

The reason that the same pressure will pass less air in the second airway than in the first is that the second airway has a larger perimeter, and therefore a larger extent of rubbing surface, for the same sectional area of the airway.

Ques.—(a) What angle is included between N 60° E and N 25° W? (b) What angle is included between S 20° W and N 70° W?

Ans.—(a) The given bearings, in this case, being each measured from the north end of the meridian and lying in different quadrants on opposite sides of the meridian, the angle included between them is $60 + 25 = 85$ deg.

(b) In this case, the first bearing given is measured from the south end of the meridian, while the second is measured from the north end; and, both of these bearings lying on the same side of the meridian, the angle included between them is found by subtracting the sum of their angles from 180 deg.; thus, $180 - (20 + 70) = 90$ deg.

Ques.—Give the names, chemical symbols and composition of the different gases met with in coal mines.

Ans.—The most common mine gases are the following:

Methane or marsh gas; symbol, CH_4; comp., 1 atom carbon, 4 atoms hydrogen.
Carbon monoxide; symbol, CO; comp., 1 atom carbon, 1 atom oxygen.
Carbon dioxide; symbol, CO_2; comp., 1 atom carbon, 2 atoms oxygen.
Hydrogen sulphide; symbol, H_2S; comp., 2 atoms hydrogen, 1 atom sulphur.
Olefiant gas; symbol, C_2H_4; comp., 2 atoms carbon, 4 atoms hydrogen.

There are, besides, the gases forming the atmosphere; namely, oxygen and nitrogen, in more or less definite proportions.

CORRECTION—Attention has been called by readers to an oversight in failing to complete the answer to Question 12 of the Pennsylvania Bituminous Examination, May, 1914, COAL AGE, June 20, p. 1025. The value of one-half the water gage is given as 5.1 in. To this answer should have been added

$$w.g. = 2 \times 5.1 = 10.2 \textit{ in.}$$

Coal and Coke News

Washington, D. C.

It is now practically established that the decision of the Interstate Commerce Commission in the 5 per cent. freight rate advance case will be handed down by the time this issues from the press. Of course, there is always a possibility that unexpected circumstances may intervene to prevent the carrying out of the program in regard to this case, as has so often happened in the past, but the present prospect of such a failure seems small—less than on any previous date.

While many rumors are in circulation, there is no reason to doubt the essential accuracy of the forecasts already made with regard to the case. These indicate that there will be some moderate advances on the more expensive articles of freight which move in large quantities. On the bulky commodities which furnish the basis of freight tonnage there will be no advances.

Conspicuous in the latter class of items, it is now understood, will be coal and ores. From the start there has appeared to be little warrant for any belief that an advance in these articles will occur. The commission and its counsel have shown a consistent indisposition to advance rates on coal and this has been borne out in a good many of the minor decisions that have come forward from time to time, in which the coal rates are involved:

A refusal by the commission to advance rates on coal will not, according to expectations, be the last of this matter, as coal operators have indicated a definite determination to secure a reduction of the charge made by the railroads in the anthracite regions and the Department of Justice is apparently committed to that course of action. Bituminous rates are already considered by many to be higher than they should be. Both in the matter of coal and of other articles in the same class it is to be expected that the rate controversy will go on, without reference to the actual findings in this particular case.

Larger Appropriation Is Asked

Working for the increased appropriation for which the Bureau of Mines has made request, Director Holmes has just given elaborate testimony before the House Committee on Appropriations, with a view to convincing that body that the extra $100,000 suggested should be granted. Mr. Holmes stated that he particularly wants this money for the study of waste in smelting and for the ascertainment of the best use to be made of gases from the smelters. He said that the gases contained primarily sulphur and arsenic, one smelter in Montana thus throwing out into the atmosphere many tons a day.

"The damage is extending for miles around," added Dr. Holmes. 'In the case of another smelter in California the damage can be traced 25 miles where the drift of the wind is constant for a considerable period of time, and the area is extending. We have demonstrated how to take care of arsenic and the metalliferous materials given off in small quantities, such as lead fumes and that part of the sulphur given off in the form of sulphuric acid, which is decidedly injurious.

We have found cases of damage from the arsenic, from the lead and from other metallic fumes. About the smelter itself, where the employees of the company operate, most of the damage done has been from the lead and arsenic gases. The policy we have pursued is the proper one to follow, that wherever it was feasible to do so investigations of this kind which were totally local in their character, should be paid for by the companies themselves rather than by the Government.

In connection with the smelter investigations there were certain problems which the smelter companies have practically declared to be unsolvable, and they did not think they ought to be called upon to spend money to solve problems which they did not think could be solved and which apply to other smelters as well as to themselves. Of the appropriation last year for this general work we have expended in all for smelter work $15,000. Wherever the problem was at all a local one we have required the smelter company to do the investigating. We have selected the men and we have mapped out the line of examination which we thought should be followed, but every dollar of expenditure and the employment of the men and the handling of the moneys has been entirely within the hands of the smelters.

What we do is entirely laboratory investigation on our part to determine, primarily with reference to sulphur gases, what can be done.

Dr. Holmes also made mention of the use of an invention by a Government employee which by virtue of the use of metal plates charged with electricity produced a deposit eliminating smoke.

It is now being used in smelter operations in various ways, he said. It is being used to take the arsenic out of the smelter gases as refined arsenic. It is being used in connection with petroleum in California, where the petroleum becomes so thoroughly mixed with water that it forms an emulsion so that the water will not separate from the oil by gravity.

It has been tested by several smelter companies to such an extent that they are now actually installing large scale plants for such purposes. Another interesting application was in southern California, where two large cement plants in the center of orange groves were destroying them. They prevented the dust from leaving the stacks.

With the expenditure of $15,000 we have this year conducted the more abstract of these investigations, which could not be considered local in this character. Three of the smelters, under our general advice, are conducting investigations, each one of which costs practically as much as the amount we are spending. It seems our duty to get other people to bear these burdens just as far as feasible. We handle none of the money of these smelter companies; we plan the investigations and select the men to do the work and watch the results.

Dr. Holmes was asked by members of the committee about the waste of sulphuric acid.

The only possible use for this acid, he said, will come when it can be collected, and its collection involves the storage of an enormous quantity. Unless there is a market for sulphuric acid, there should be the question of storage, and it would be leaking into the streams, which would be just as vigorously opposed as turning the gas loose in the atmosphere. What we are trying to do is to find some means of collecting it as sulphur in the form of a solid, so that it can be compressed into cakes; then it can be stored without any difficulty or loss in storage.

Sulphuric acid is used in a good many manufacturing operations in the East, but the supply comes in the main from Sicily, because the cost of transportation from the West makes its price greater. Nevertheless, we are trying to get some of the larger smelter companies to go into not only the manufacture of sulphuric acid but also of the phosphates.

Dr. Holmes mentioned other lines of investigation—such as safety and waste investigations in certain metallurgical plants, like those for the extraction of silver and gold.

He asked for an additional appropriation of $20,000 for the next year. It is especially desired to use this money, he explained, with reference to investigating the explosives used in metal mining and quarrying. In metal mining, he said, they want quick action, because they want to shatter the ore or rock, but they do not care anything about low temperature. What they want is an explosive that will produce the minimum of poisonous gases, because, as he said, in metal mining there is no such extensive ventilation system as in coal mines.

Poisonous gases, he explained, came from the powder used, decidedly injuring the men until they finally became unfit to work. To instruct them pictures were being used, he told the committee, because most of the men did not understand English. With each picture is a line or two in four different lauguages. "By that means we get them to understand the meaning of these lectures," said Dr. Holmes, "and we have been quite successful in bringing out the entire attendance of the miners. They will come to see the pictures and then try to learn all about safety projects. We would be still more effective if we could afford to use moving pictures."

HARRISBURG, PENN.

An action in equity which will raise the question whether men who have not had five years' experience as practical miners are eligible to receive certificates as mine foremen or assistant mine foremen, was brought in the Dauphin County Court, this city, on June 24 by James J. Moran and James B. Reilly, Pottsville solicitors for James Mathews president of district No. 9 of the United Mine Workers.

The action is to restrain James E. Roderick chief of the Department of Mines from issuing certificates to any of the 139 miners who may be returned as having passed the examination for certificates held at Pottsville May 25 and 26. It is contended that some of the applicants were not eligible to take the examination and will lay before the court the dispute whether men can be given certificates without having worked for five years.

PENNSYLVANIA

Anthracite

Plymouth—Operation at Dodson No. 1 colliery, Plymouth Coal Co., has been entirely suspended and the mules hoisted. The custom was to take the mules out daily from all workings except the Red Ash or lower vein. All hands have been suspended except those necessary for the safety of the property. The closing by injunction of certain sections of the mine made it too expensive to operate the Red Ash vein alone, hence the suspension.

Dunmore—When a car of coal being hoisted to the breaker of Grove Colliery of the Pennsylvania Coal Co. got beyond the control of the nippers and ran into the heavy gearing apparatus on June 24, work at the colliery was suspended, which threw 500 men and boys out of employment for the day. It was expected that the damage done by the car would be repaired at once so that work could be started at an early date.

Centralia—Centralia is gradually settling down into the mines or at least the entire west end of the town is so doing. Some few years ago there was a large cave-in on the main street, now the streets east of Troutwine are gradually settling and the people are getting worried. For the past two years a slight settling has been noticed and on June 26 the residents of Troutwine and other streets west were busily engaged in raising their homes, they having sunk almost 3 ft. in that time.

Bituminous

Ellsworth—This town will be the scene of a big Fourth of July celebration the plans for which have been worked up by E. E. Bach, sociological superintendent of the Ellsworth Collieries Company.

Honesdale—Indications of coal have been discovered on the farm of David McGraw, and a prospector has been employed to ascertain the extent of the deposit, if any exists.

Hastings—Current from the Penn Central Light & Power Co. was recently turned into the workings of the Pennsylvania Co., known as mines Nos. 11, 12 and 13. In addition to supplying the mines, however, the town of Hastings will be lighted by the central station company.

Fayette City—Fire on June 25 destroyed the stables of the Pittsburgh Coal Co. and two dwellings at Nauvoo Hollow, near Fayette City. The loss, which was partly covered by insurance, is estimated at $7000.

WEST VIRGINIA

Wheeling—By a majority of 6, the miners of the Mound Coal Co., who have been on strike for some time, on June 26 voted to return to work. The vote was on the question of whether or not the men would return to work without the bonus which the operators had been paying. A committee was apointed to ask that the miners be permitted to have a check weighman, and also that the company repair its screens, which are claimed to be in a bad condition. It is likely that both propositions will be granted.

Charleston—Part of the vote of the miners of the Kanawaha district as to whether they will accept the second proposition offered by the federal mediators in the strike settlement was rejected June 26 by officials of district 17, and went back to the local unions for correction. The officials claim they found illegalities in the vote of 19 of the locals in the district. This action postponed settlement of the strike.

About 150 miners of the Milburn Coal Co., on Paint Creek, who had been working pending an adjustment of the disputes between operators and men in the Kanawha field, struck on June 24, on account of the continued failure of the factions to reach an agreement.

Fairmount—On the afternoon of June 23 a fire was discovered in the main dip heading at the Barnesville shaft of the Consolidation Coal Co. All men and animals were immediately removed from the mine, and fire apparatus and helmet men from adjoining developments hurried to the scene. The latter spent the night in fighting the flames, the origin of which could not be determined.

KENTUCKY

Pineville—A jury in the Bell County, Ky., Circuit Court returned a verdict recently for $20,000 as damages against the Coleman Coal Mining Co. in the case of James Aslinger's administrator against that firm. Aslinger was killed while at work in the mines of the defendant company. The case will go to the Appellate Court of the state.

Whitesburg—The Consolidated Coal Co. has put 200 additional negro miners at work in the mines around Jenkins and McRoberts. All the mines are now running full time.

Henderson—Sugg & Sights, L. S. Jackman and others, announce the sale of several thousand acres of virginia coal lands in the Hebbardsville, Zion and Niagara districts to outside capitalists. Names are withheld, but it is stated that the new owners will develop the properties at once.

Louisville—Coal operators in this vicinity are making extensive preparations for the meeting on Aug. 18 to 20 of the National Commissary Managers' Association. The programs of the various sessions will be educational with addresses by noted merchandising experts, stereopticon lectures showing ideal store arrangements, attractive disposition of stock, etc.; symposiums dealing with methods of building up commissaries, the evolution of commissary managers from clerical positions to executive posts and specific ways in which the ambitious commissary manager can increase his efficiency.

OHIO

Cincinnati—Charles W. Poysell and Edward Marmet, receivers of the Marmet Coal Co., were recently granted permission to give an option upon the entire assets of the coal company to New York parties for one million dollars. The business is to be continued as a going concern by the receivers.

Columbus—Word comes from certain parts of the Hocking Valley mining district to the effect that many of the rank and file of the miners' organization are opposed to the methods employed by the union in distributing strike benefits. Since the start of the suspension, April 1, only $6 per man has been paid as strike benefits. These men will insist that their assessments be distributed in their local district.

Lowellville—It is announced that the Lowell Coal Co., whose mines have been idle for the past two months, will resume operations shortly, as soon as the installation of a quantity of new electrical equipment is completed. The plant will be one of the best equipped in the state when this installation is ready for operation.

INDIANA

Brazil—The engine house and tipple of the Progressive mine, south of Brazil, were recently destroyed by fire, the loss being about $3000, with no insurance. This mine has been abandoned for some time.

The Crawford Coal Co. is sinking a new mine north of this city. It will give employment to 200 men.

Shelburn—The Reliance mine, one o fthe largest in Indiana, will be reopened shortly, after a shut-down since April.

Jeffersonville—The assessment against the Monongahela Consolidated Coal & Coke Co. shows a large falling off, due to the removal of several floats and much cable and machinery to Cairo, Ill. The stock of coal in the local harbor is also less than a year ago.

Washington—George Trowbridge, of Bicknell, Ind., has bought the Elnora mine and will extend its development.

Evansville—The Deepwater Coal & Coke Co., which recently took options on a large number of mines in southern Indiana and western Kentucky, is now surveying the Sebree mines at Sebree, Ky.

ILLINOIS

Pana—Following a hearing of the suit in the Circuit Court, Judge James McBride ordered Master in Chancery James Brennan to sell at foreclosure all properties ,mines and machinery of the Pana Coal Co. This company was placed in the hands of receivers last fall as the result of suits filed by Farson & Co., Chicago bankers, for interest due on bonds. The bonded indebtedness of this concern is placed at $219,000; unpaid interest, $20,718.50; receivers' certificates and expenses, $25,000; receivers' and attorneys' fee, $15,000.

Princeton—Arrangements have been made for the opening of the mine at Marquette in the near future. A new company has been formed under the name of the LaSalle-Hennepin Coal Co. to operate this mine, which was closed down some time ago by order of the state mining board. The new company expects to put the mine in shape to conform to the state laws, and begin operation.

Glen Carbon—No. 2 mine of the Madison Coal Corporation will shortly be operated to its full capacity. This mine has been opened and a force put to work cleaning it up. It is expected that 200 men will be employed, and that probably 2000 tons a day will be taken out for a while, but it is anticipated that this will be increased shortly to 3000 tons.

KANSAS

Pittsburg—The Chapman Coal Co. will shortly install self-rescuers in its mine No. 5. The apparatus will be worn by shot-firers in the performance of their work.

ARKANSAS

Russellville—The improved situation in Arkansas has resulted in resumption of operations by a number of mines. The Russellville anthracite mines have resumed work, while several smaller ones are tuning up for full-time operations.

COLORADO

Louisville—Charles C. Welch, F. W. Loveland and Henry B. Teller, directors of the Louisville Mining Co., have been sued in the District Court at Boulder by Charles A. Campbell for $1650 damages for alleged undermining of his property, causing his store building, located near the main part of the city, to sink.

WYOMING

Cheyenne—Alleging that the Wyoming Coal Co., operating in Sheridan county, has defaulted interest and failed to keep its mortgage contract, and is about to default in its payroll, the Continental Trust & Savings Bank, of Chicago, has applied to the United States District Court for the appointment of a receiver.

WASHINGTON

Douglas County—A supposed coal deposit recently found 35 miles east of Roseburg has been reported upon by Ira A. Williams, of the Oregon Bureau of Mines, and was found to be obsidian or worthless volcanic glass. Over 20 claims had been filed and considerable work done.

FOREIGN NEWS

Piedras Negras, Mexico—A demand for the payment of $100,000 in gold has been made of the Aguila Coal Co. by constitutionalist officials. If this money is paid, it is announced that threatened confiscation of the property will be temporarily deferred. All efforts of American and French stockholders, owners of coal mines confiscated a month ago, to recover their property have failed.

TRADE CATALOGS

The J. C. Stine Co., Tyrone, Penn. Bulletin No. 18. Twenty eight pages 8x9½ in. illustrating and describing Stine fans, engines and pumps.

Western Electric Co., 463 West St., New York. Catalog. Western Electric inter-phones and accessories. Illustrated, 48 pages, 7½x11 in.

Pawling & Harnischfeger Co., Milwaukee, Wis. Bulletin No. 301A. "The Application of the Electric Hoist." Illustrated, 8 pages, 6x9 in.

Ottumwa Iron Works, Ottumwa, Iowa. Catalog No. 30. Electric and steam hoisting engines and mine equipment. Illustrated, 116 pages, 7½x10 in.

The Mesta Machine Co., Pittsburgh, Penn. Bulletin "O." "Mesta Rope Drives." Eigh pages, 6x9 in., illustrating and describing rope transmission machinery.

The Martin-Hardsogg Co., Pittsburgh, Penn. "Distinctive Mining Tool Makers." Catalog "H." Seventy-eight pages, 7x10 in., describing mining tools and supplies.

The Mesta Machinery Co., Pittsburgh, Penn. Bulletin "N." "Air Compressors and Vacuum Pumps." Eight pages, 6x9 in., illustrated with drawings, diagrams and halftones.

The National Stoker Co., Covington, Va. "Crowe Stokers." Thirty-two pages, 6x9 in., with numerous drawings and illustrations, showing installations of Crowe chain grate stokers.

Edward Darby & Sons Co., Philadelphia, Penn. "Expanded Metal and Ventilated Sheet Lockers." Leaflet of 8 pages, illustrating and giving general specifications of Pen-Dar metal lockers.

The Sullivan Machinery Co., Chicago, Ill. Bulletin No. 63M, replacing Bulletin 63H. "Sullivan Iron-Clad Coal Cutters." Thirty-six pages, 6x9 in., illustrating iron-clad coal-cutters and their usage in coal mines.

The Electric Storage Battery Co., Philadelphia, Penn. Bulletin No. 146, May, 1914. "The Iron-Clad Exide Battery for Storage Battery Locomotives." Eighteen pages, 9x11 in., illustrating and describing storage batteries for locomotives.

Weston Electrical Instrument Co., Newark, N. J. "Experimental Electrical Testing by Students." Seventy eight pages 6x9 in., illustrating various electrical tests and apparatus. The book is compiled for and is of especial value to science teachers.

The Atlas Power & Manufacturing Co., of Cleveland, Ohio. Bulletin No. 1155. "Storage Battery Locomotives." Nine pages, 6x9 in., illustrating and describing various sizes and types of storage battery locomotives, particularly adapted to mine usage.

The Atlas Car & Manufacturing Co., Cleveland, Ohio. Bulletin No. 1165. "Electric Side, Rotary, and Rocker Dump Cars." Pamphlet of 8 pages, 6x9 in., illustrating and describing self-propelled dump cars, particularly applicable to slate disposal at mines.

PERSONALS

C. M. Means, electrical engineer, of Pittsburgh, Penn., has been apointed consulting electrical engineer with the U. S. Bureau of Mines.

J. R. Crowe, head of the Crowe Coal Co., operating mines at Pittsburg, Kan., will leave shortly for a tour of Europe. Mr. Crowe intends to inspect a number of mines while abroad, though the trip will be primarily for pleasure purposes.

George D. Key, candidate for attorney-general of Oklahoma, is making promises of putting the alleged "coal trust" out of business. Mr. Key, in recent speeches, has attacked the McAlester Coal Co. and others, alleging that operators have conspired to mulct the consumer.

Joseph Elwood, for several years with the Pittsburg & Midway Coal Co., at Pittsburg, Kan., has resigned to become general manager of the P. R. Sinclair Coal Co., of Aurora, Mo. He will have charge of the marketing of the company's output, with offices at Pittsburg, Kan.

Governor Cox, in a statement issued recently, denies that he will bring to the attention of the special session of the Ohio General Assembly the question of amendments to the Green mine-run law. He says the special session is called for taxation legislation, and nothing else will be taken up.

H. D. Mason, Jr., who has been in charge of the government mine rescue car at Pittsburg, Kan., for the past year, has been transferred temporarily to Pittsburgh, Penn., succeeding J. W. Paul, engineer-in-charge, who will leave shortly for an inspection tour of European mines. K. H. Chisholm probably will be transferred to Pittsburg, Kan., from McAlester, Okla., pending Mr. Mason's return. A. I. Young will be in charge of the car at Pittsburg.

Russell G. Belden and A. Eugene Wayland, of Spokane, Wash., who were recently convicted of using the United States mails to defraud, in the promotion of coal-mining companies, have been sentenced by Federal Judge Frank H. Rudkin to imprisonment, Belden's sentence being confinement in the federal prison on McNeil's Island for one year and one day, and Wayland's six months in the Spokane county jail. A stay of judgment, however, was granted, and the men were allowed to have their liberty on bail, pending an appeal to the United States Appellate Court at San Francisco.

James Taylor, formerly Illinois state mine inspector, now of the Draeger Oxygen Breathing Apparatus Co., of Pittsburgh, Penn., who was on a visit to Kincorth, Saskatchewan, Canada, on hearing of the coal-mine disaster in southwest Alberta, hurried to Hillcrest. After having made a careful study of the work done in connection with efforts at mine rescue on that occasion, he states that the men from the rescue stations of both Alberta and British Columbia did splendid work in recovering the bodies of those killed by the explosion, although there was no opportunity to get men out of the mine alive, death having overtaken them almost immediately.

OBITUARY

August Diehl, a former coal operator, died at Fulton, Mo., on June 22, after a short illness. Mr. Diehl retired from active business several years ago. He was 72 years old and a native of Germany.

William Guest, aged 78 years, one of the pioneer colliery engineers of the Lackawanna Valley, who died on June 23, in Scranton, could boast of never having experienced an accident in over 50 years of service at the Pyne shaft. He was employed by the Lackawanna Coal Co. for 51 years.

CONSTRUCTION NEWS

Waynesburg, Penn.—John Bender and John Zubal are preparing to open a mine in the Mapletown vein of coal under the McNatt farm in Cumberlad Township.

Nashville, Tenn.—At a cost of $5000, the St. Bernard Mining Co., George C. Atkinson president, is erecting a corrugated iron paint shop here, using its own employees.

Fairchance, Penn.—Arrangements have been made for the opening of two coal mines near Fairchance. The 9-ft. vein of coal will be worked, a contract having already been made for the coal mined.

Columbus, Ohio—Negotiations have been completed by the National Coal, Fuel & Supply Co., which has offices in the New Hayden Building, Columbus, for the purchase of a tract of 3200 acres of coal lands in Buchannon County, Va. The consideration is approximately $288,000. The load was purchased from the Roanoke Land Co. and the local corporation proposes to develop it in the near future.

Whitesburg, Ky.—Real estate, coal and timber land values have gone up in the lower end of Letcher County since the announcement was made that the Wasioto & Black Mountain R.R. would be extended from Benham, Harlan County, through Pine Mountain and down Pine Fork Creek. A crew of engineers is on hand preparatory to making the survey, and it is declared that construction work will be begun at once. The extension, which will run about 16 miles, will mean expensive tunnelling and grading and will open up an exceedingly rich country.

Toledo, Ohio—The $2,000,000 dock and harbor improvement of the Hocking Valley Ry. Co. at this point is nearing completion. It will be one of the most important pieces of dock and pier improvement in this section and will put the Hocking Valley foremost among railroads handling coal on the Great Lakes. The two loading machines, one of which has been completed and the other to be finished by Aug. 1, will be the largest in service on the lakes. They will be capable of handling 40 cars each of 50-ton capacity per hour, and can load the largest coal boat on the lakes in 6½ hours. During a season of navigation they can handle 10,000,000 tons of coal.

NEW INCORPORATIONS

St. Clairsville—The Big Five Coal Co. has reduced its capital stock from $300,000 to $6000.

Vincennes, Ind.—The Wasson Coal Co. has increased its capital stock from $150,000 to $175,000.

Carbon Hill, Ohio—The Russell Run Coal Co. has increased its capital stock from $10,000 to $20,000.

Bridgeport, Ohio—The Pursglove Coal Mining Co. has made a reduction of capital stock from $100,000 to $5000.

Matoka, W. Va.—The Delparen Briquet Co. has been incorporated with a capital stock of $100,000 to manufacture briquets for fuel

Liberal, Mo.—The Liberal Coal & Mining Co. has been formed to operate a steam shovel at Liberal, Mo. J. H. Vincent, a mining engineer, of Pittsburg, Kan., is the head of the new concern.

Gary, Ind.—The Mid-West Diamond Drilling Co. has been organized with a capital stock of $20,000. The business of this firm will be mining. The directors are William L. Brennan, James B. Brennan and John A. Brennan.

Skelton, W. Va.—The West Virginia Coal Mining Co. has been organized for coal development with a capital stock of $50,000. The incorporators are T. R. Ragland, of Skelton, W. Va.; K. L. Moon, E. F. Simpson, M. L. Norvell and W. M. Beckers, Jr., all of Richmond, Va.

Peel Tree, W. Va.—The Little Mountain Coal Co. has been granted a charter. The chief works of the new concern will be at Peel Tree. The organization is capitalized for $500,000, $5000 of which has been subscribed and paid in. The firm will do a general coal mining business

Henderson, Ky.—The Kentucky-Henderson Coal Co., with a capital stock of $425,000, has been incorporated by the following, all of 1137 Schofield Bldg., Cleveland, Ohio: J. A. Curtis, L. C. Mizer and W. H. Hill. Mr. Curtis is soon to announce the details of the developments the company will make.

INDUSTRIAL NEWS

Pottsville, Penn.—A peculiar situation recently developed in Pottsville. The town ran entirely out of nickels. The Philadelphia & Reading Coal & Iron Co. was handicapped in making up its payrools and the government was asked to ship $10,000 in nickels to the region.

Athens, Ohio—Howard Manington, representing the Ohio Electric Co., which has started the construction of a $1,000,000 power plant at Flodwod, Ohio, for the purpose of supplying electric current to mines in that neighborhood, is trying to make contracts with cities and towns for furnishing light.

Washington, D. C.—Investigation of charges that a "coal trust" is influencing coal-carrying railroads to discriminate against Atlantic ports south of Norfolk will be begun by the Interstate Commerce Commission early in July. Subpœnas have been issued for several prominent men connected with the interests concerned.

Charleston, W. Va.—In the hope that the state will be able to properly distribute labor, sending idle men to points where they are needed, J. H. Nightengale, commissioner of labor, recently announced that a free employment bureau will be opened. This action is taken under an act of the legislature passed in 1901, but never enforced.

Parkersburg, W. Va.—The Sylvester Co. has announced the removal of its business headquarters from Connellsville, Penn., to Parkersburg, W. Va., the object being to secure a more central location in the coal-mining district. The name of the firm is also changed from the Sylvester Co. to W. Sylvester. This, however, involves no change in ownership, management or policy.

Columbus, Ohio—The W. J. Hamilton Coal Co. has filed an answer to the petition, filed several days ago, asking the United States court to declare it bankrupt. The company denies that it is insolvent or that it is a bankrupt, and asks that the case be dismissed. The petition asking that the company be declared bankrupt was filed by the Buffalo Collieries Co. and others.

Philadelphia, Penn.—A protest has been made by the grievance committee of the Delaware, Lackawanna & Western R.R. mining employees against the patrol system recently inaugurated at the company's mines. This system was established in the interest of the workmen's safety and not, as charged, for the purpose of driving the men to work. The protest carried with it a strike threat, but this, it is believed, will be averted.

Birmingham, Ala.—The officials of the Tennessee Coal, Iron & R.R. Co. recently announced the receipt of an order for steel rails amounting to 32,000 tons from the Frisco line. This steel will be used in relay work, the construction of passing tracks and some new construction along its line. Steel plant operations, although not at the maximum, have been more or less satisfactory, and the belief is entertained that there will be but little idle time this summer.

St. Louis, Mo.—The Interstate Commerce Commission has ordered the Rock Island and Denver & Salt Lake railroads to establish on or before Sept. 1, and maintain for at least two years from that date, rates on bituminous coal from the Oak Hills district, Colorado, to destinations in Kansas, Nebraska and Missouri, not in excess of those contemporaneously in effect from the Walsenburg district to the same destinations. The railroads proposed to increase rates.

Pittsburgh, Penn.—The H. K. Porter Co. intends shortly to bring out a new type of locomotive, combining as practical features compact construction, vertical boiler, gasoline, kerosene or fuel-oil burner equipment, piston valves, outside valve gear and a condenser attachment to eliminate steam exhaust in mines and tunnels. Equipped with a gasoline burner, this locomotive gives absolutely no smoke or obnoxious gas in the exhaust, making it ideal for tunnel or mine service.

Seattle, Wash.—Four hundred tons of coal mined by the government in the Matanuska coal fields of Alaska for the use of the navy in making steam tests was recently brought by the steamship "Admiral Sampson." The coal was discharged at the Puget Sound Navy Yard, where it will be stored until the armored cruiser "Maryland," which has been selected to make the test, can be spared from service in Mexican waters. Four hundred and fifty tons of coal are still at Knik, Alaska, and probably will be brought down on the next steamer.

Coal Trade Reviews

General Review

Heavy curtailment in the anthracite regions marks the inception of the usual midsummer lethargy. Individuals working full and forcing the market. Eastern soft-coal buyers fail to respond to unusually low prices and trade devoid of further absorbing paver. Western situation developing a better tone.

The regular monthly increase in the anthracite circular on Wednesday of this week, has forced a heavy general restriction in operations throughout the mining regions for the first time this season. Many of the large companies shut down on Tuesday night and will remain closed until Tuesday morning of next week; the curtailment was of larger proportion than anticipated and marks the beginning of the usual summer dullness in the anthracite trade. The individual operators are attempting to work full time but are obliged to make heavy concessions on the circular, sales down to the April discount and even less being frequently made. The consumers are getting well stocked and the market has little further absorbing power. Stocks at the upper Lake ports are still excessive and will continue so until the crops begin to arrive but the Lake movement is about normal.

There is no life to the Eastern bituminous market in any direction. Buyers are indifferent to low prices, some exceptionally good offers failing to move tonnage and the trade appears to be completely devoid of further absorbing power. With many of the manufacturing plants closing down on July 1, the midyear period, to take inventory and undergo a general overhauling, the indications are for a further curtailment, temporarily at least. The increased demand in the West for certain of the West Virginia grades has diverted some coal from the Eastern market but not sufficient to relieve the tension. The bunkering business at tidewater continues light but the foreign trade is proving excellent.

The Lake market still fails to develop the expected activity. A slight increase from the Pittsburgh district is noticed, but this is offset by a reduced consumption among manufacturing interests as a result of the customary mid-year shut down. The labor deadlock in Ohio is still in effect and seems to be more complete than ever before; indications now are that settlement will be effected by subdistricts. In the meantime current requirements are being obtained from outside sources and some improvement in the steam grades is noted with prices slightly stronger. The resumption of operations in the Kanawha field has had a depressing effect and surpluss tonnages are again accumulating. Steam fuels in the Southern market are notably firmer, industrial activity apparently being on the increase there; the higher grade domestic coals are also bringing a slightly better price.

The steam coals are reported generally stronger throughout the Middle West also. In spite of the many adverse conditions in different parts of the country the large Western crops are undoubtedly having a stimulating effect upon the situation there. There are quite a number of contracts still being held back but prices are well maintained and there will be a rush to close contracts at the first indication of any improvement. Mines as a rule are on about half time schedule.

ATLANTIC SEABOARD

BOSTON

Continued summer dullness. Fewer "market cargoes" the only hopeful sign. Prices show no improvement. A slightly better movement of Pennsylvania grades looked for in July. Anthracite consumers taking on very little.

Bituminous—There is no improvement in the tidewater situation. Pocahontas and New River prices continue as weak as at any time in June and there appears to be no life to the market in any direction. There are perhaps fewer cargoes of consignment coal to be forced on reluctant purchasers, but otherwise there are no hopeful signs to report. There are now practically no contracts left open and it is hard to see where any buying power can develop during July and August. What coal comes forward aside from "market" lots is almost exclusively for application to contract business and the volume of such business is much smaller than usual at this season. The amount of sail, barge, and team colliers laid up for lack of business has increased rather than diminished and beyond a few half-hearted appeals for "offers," the transportation people are reconciled to the general dullness and do not shade rates below what would yield some sort of return.

The amount of coal standing at the Hampton Roads piers continues to be very large. Spasmodic efforts are made here to move blocks of it beyond what can be shipped to regular contractors, but an ordinary "cut" proves as ineffectual as none at all. Buyers are now so callous to low prices that they have ceased to be responsive.

The Pennsylvania varieties will be helped a little by the slackening demand for anthracite. There was a reduction of 5c. in the water rate from Philadelphia on railway barges carrying bituminous temporarily, both for part and for whole cargoes. The movement should therefore be somewhat improved during July, particularly because many Eastern buyers wait for just such a situation. Prices are unchanged; operators are still obliged to name bottom figures on what tonnage they move.

There is no new feature in Georges Creek. What is mined is confined pretty well to contract and prices therefore show no weakening.

Anthracite—July opens with a small amount of tide orders held over from June and a fair prospect of business the latter part of the month. Meanwhile, the holidays in the region, are likely to cause curtailment of output, and a dull spell is looked for. Retail dealers are not favored with more than scattering orders from consumers and stocks in most parts of New England are well up to the limits of storage.

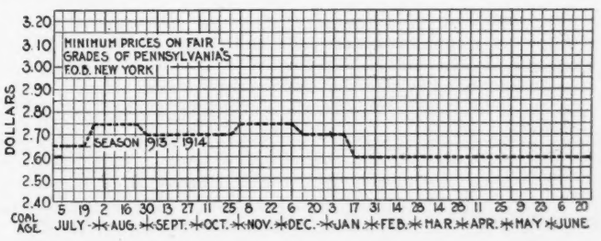
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.40	$1.10@1.55	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.3 @2.80	2.92@3.02	
New York*.....	2.45@2.95	2.6 @3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.55@2.85
Boston†.....	.....	.....	.....	3.25@3.63
Providence†.....	.....	.....	.....	3.25@3.63

* F.o.b. †On cars.

NEW YORK

Bituminous production still restricted and further curtailment anticipated. Stocks depleted and a moderately firm undertone prevails. First general suspension of the season becomes operative in the hard-coal regions.

Bituminous—A steadily increasing dullness charatcertizes the local soft-coal market. Negotiations on the new contracts have ceased entirely for the moment and practically no spot business whatever is being done. Production for the current week was about on the same reduced schedule as last week, but further curtailment is anticipated next week when many industrial concerns will close down for two weeks, taking inventories and giving their plants a general overhauling.


MINIMUM PRICES ON FAIR GRADES OF PENNSYLVANIA'S F.O.B. NEW YORK
SEASON 1913-1914
DOLLARS
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
5 19 2 16 30 13 27 11 25 8 22 6 20 3 17 31 14 28 14 28 11 25 9 23 6 20
COAL AGE
JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE

As has been the case for some time past, the movement is restricted entirely to contracts, and requisitions on these are much reduced. A moderately strong demand for gas coal in the West is relieving the tension on these grades in the Eastern markets to a certain extent. The West Virginia gas-coal operators are probably working close to full

rated capacity, while it is doubtful if the steam-coal mines are producing 50% of their possible output.

There is still a great deal of coal being held in boats to avoid demurrage which can possibly be obtained at concessions. Aside from this, there is no evidence of any consignment coal at Tidewater and no forced sales at sacrifice prices are being reported. The unusual condition of restricted operations with the Berwind Company still prevails, due no doubt to the adverse conditions in the bunkering trade, but as a rule the supplies at Tidewater are only normal. Probably no new contracts are being closed but some of the agencies have figures out on the same basis as last year. No business whatever is being done in the spot market but the prices remain quotable on the same basis as for the past several weeks as follows: West Virginia steam,, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The salient feature of the hard-coal market during the current week has been the general restriction in operation on the part of most of the big companies; many of them suspended operations Tuesday night and will remain closed until Tuesday of next week while all the others are curtailing to a certain extent. This is the first general suspension throughout the mining regions and marks the beginning of the customary summer dullness in the anthracite trade. That a restriction in operations has been imminent for some time was generally agreed to by all, but it was hardly expected to be of such large proportions. A combination of several conditions has made this necessary. There is scarcely any demand at the moment except for stove coal, and with the increase of 10c. in the circular on domestic grades on Wednesday, July 1, what little demand there was, practically all disappeared.

There is practically no demand on any of the sizes. Stove coal which has been in short supply throughout the season can now be had for reasonably prompt shipment in any desired tonnage. Pea and buckwheat are being stocked heavily. It is expected that the customary lethargy following the 10c. increase on the first of the month will prevail until well toward the close of the month when another spurt is expected. We now quote the New York market on the following basis with the circular on the prepared grades, increased 10c. per ton:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.90	$4.60@4.90	$4.85	$4.55@4.85
Egg	5.15	5.00@5.15	5.10	4.90@5.10
Stove	5.15	5.15	5.10	5.10
Chestnut	5.40	5.10@5.40	5.35	5.00@5.35
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Market for anthracite growing more stagnant. No immediate improvements indicated. Bituminous situation slightly more encouraging, but it is still difficult to negotiate a sale even at the low prices prevailing.

Anthracite—The anthracite situation still continues to slow up as the summer progresses. Continued inactivity in the industrial field has reduced the demand for the small sizes to such an extent that most of the output is being placed in stock. The domestic market is absorbing all the stove coal, but on the other sizes, short-time work at the mines is sufficient to meet all requisitions. Tidewater business is gradually disappearing. Individual operators still continue to work their mines on full time, and buyers are quoting their own figures. Quotations of $2.10 and $2.15 for pea coal, without the tax, are freely made, and April prices or in some cases less, are the rule rather than the exception. The price of stove is about the only figure that is being maintained, and a comfortable order for chestnut will have a tendency to reduce this also.

Tidewater prices rule about as follows:

	Circular	Individual
Broken	$4.55	$4.55
Egg	4.80	4.60 @ 4.70
Stove	4.80	4.80
Chestnut	5.05	4.70 @ 4.80
Pea	3.25	3.00

Bituminous—The bituminous market still continues, as a whole, dull and listless. With the exception of possibly an increased demand, due to the fact that some of the manufacturing establishments have had to replenish their stocks to a certain extent, there is little change over the previous week. Prices for the medium coals are still quoted at from 90c. to $1.10 and the better grades $1.25 to $1.35, with considerable effort attached to making sales at even these figures.

BALTIMORE

Industrial troubles in the West are stimulating West Virginia prices. Eastern business continues slow and quiet. Export trade holds steady and firm.

The West Virginia situation on soft coal is being materially helped by strike troubles in some of the Middle West states. Not only are prices better for delivery West, but the mine interests are showing more of a disposition to withdraw from the poor trade Eastward. Hurry calls for coal to the West to take the place of Ohio fuels have resulted in sales of three-quarter gas at from $1 to $1.05 for prompt delivery, while the same fuels East have been quoted at a maximum of 85c. Slack, too, is doing better Westward, sales being quoted at anywhere from 65 to 75 cents.

Pennsylvania fuels have felt the effect of the Western demand to a less marked degree, the increase being largely confined to districts which have always participated in this business. Pennsylvania coals of medium grade are quoted at from $1 to $1.10. Best fuels are still firm around $1.35, on spot business. The Eastern business as a whole is rather slow and uneventful.

HAMPTON ROADS

Demand for all grades still light. Practically no coal moving except on contract. Circular prices still being quoted.

Dumpings for the week have not been heavy. There have been times when berths at all piers were vacant, although vessels have been compelled to remain in the stream awaiting turn at the dock. Taking the week as a whole, the total dumpings will just show a fair average.

Practically all coal shipped has been New River and Pocahontas run-of-mine, with some small lots of high volatile. Some coal has moved to the Southern ports, but the heaviest coastwise shipments have been to Boston, Providence, Portland and Fall River.

Quotations remain the same as they have been for some time, and, although there may be some little cutting by smaller concerns who have coal on demurrage, it is not believed any great reductions will be made in circular prices. There is still more coal in the railroad yards than normal, with a fair amount of vessel tonnage about due.

Foreign shipments for the week have been to Naples, Genoa, Leghorn, Coronel, Punta Arenas, St. Lucia, Port of Spain, Santiago, Barbadoes, Para, Pernambuco and Cerea. From present indications, dumpings for June will fall considerably behind those for May, but the prospects are there will be an increase over the figures for June of last year.

SEABOARD SHIPPING

The "Journal of Commerce and Commercial Bulletin" reports coal shipping, under date of July 1 as follows:

An active business was done in steamer chartering for grain cargoes, the bulk of which was for Montreal loading. Additional freights of the kind offer steadily for July, August and September loading, and rates are strong and buoyant, with tonnage offerings limited. The demand for tonnage in all other trades was limited and but little was done in chartering. There was no change in the sail tonnage market and nothing of consequence was done in chartering. Tonnage is abundant and offers freely, but business of all kinds is difficult to obtain. Rates are nominal and not quotably altered.

Coal charters have been reported as follows:

Vessel	Class	Nationality	From	To	Tonnage
Camilla	Steamer	Norwegian	Baltimore	Bocas del Foro	1530
Ocland	Steamer	Norwegian	Baltimore	Daiquiri	1874
Estelle Krieger	Schooner		Philadelphia	Porto Rico	1047
Augustus D. Babcock	Schooner		Norfolk	Texas City	1299
Kineo	Schooner		Hampton Roads	Texas City	1867
Chas. Whitemore	Schooner		Baltimore	Georgetown, S. C.	582
Henry W. Cramp	Schooner		Philadelphia	Bangor	1448
	Steamer		Atlantic Range	Yokahama	6000
Auchemblae	Steamer	British	Baltimore	Vera Cruz	2500
Putney Bridge	Steamer	British	Baltimore	Vera Cruz	2147
Henry Lippitt			Philadelphia	Cay Francis	

COKE

CONNELLSVILLE

A notable firming up in coke. Large contract placed at $2. Foundry grades dull at expiration of contracts.

The coke situation has firmed up decidedly, as three consumers have just placed contracts for second-half furnace coke at $2 flat, involving a total of 27,000 tons a month. One of these consumers is in the East, another in local territory and the other in the West. As prompt coke can be had at well under $2 it is inferred that the buyers expected a considerable firming up in the market in the near future. There is also indicated a stronger preference on the part of buyers for the best grades, as there are some brands of coke rather freely offered at about $1.85 for third-quarter and $1.90 for the half-year.

Prompt furnace coke is as dull as ever. Several contracts for second-half are under negotiation with sellers who are committed to a price of $2. Foundry coke is rather dull, considering that most contracts expire this week. The market is quotable as follows: Prompt furnace, $1.75@1.80; contract furnace, $1.90@2; prompt and contract foundry, $2.30@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending June 20 at 262,575 tons, an increase of 2960 tons, and shipments at 260,265 tons, an increase of 6913 tons. This is about 60% of the normal capacity of the region.

BUFFALO

Still dull and heavy, with some low prices being quoted.

The ovens are still reducing their active number, and though there is occasionally report of a firmer and more active steel market it does not affect coke. There is at present a report of coke selling at low prices, but the producers of standard grades are holding firm on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

COLUMBUS

The coke market is ruling steady in every particular. The demand is not strong and offerings are also small. Prices are firm at the figures which have prevailed for some time.

CHICAGO

The market is firm. Prices are: Connellsville and Wise County, $5@5.25; byproduct, egg, stove and nut, $4.65; gas house, $4.25.

ST. LOUIS

In June 1913 an unusually large tonnage of coke moved into St. Louis, but this season practically none has arrived from outside points. Some local coke was distributed, but not in the tonnage anticipated. A good demand is looked for in July.

LAKE MARKETS

PITTSBURGH

Mining operations unchanged at about 75% of nominal capacity. Lake movement fairly heavy, but market sales of Lake coal very light. Prospective closing of mill consumers in July. Price shading for prompt slightly diminished.

Mining operations in the Pittsburgh district continue at about 75% of nominal capacity, though at perhaps not over 60% of the possible capacity under pressure. There has been a slight further increase in shipments in the Lake trade, but this is more or less offset by small line trade since many of the mills and factories contemplate closing for a short time in July for repairs.

While the Lake movement on the whole is fairly large in tonnage, though well behind the movement of last year to this date, the proportion of coal passing through the local market for Lake shipment is small. Nearly all the coal being shipped in the Lake trade is by Lake shippers which have their own mines, or long-term arrangements with mines. There is somewhat less cutting of circular prices in the case of prompt coal, but there remains considerable, and particularly on slack. which sells down to 55c.. and possibly 50c. in some instances. Circular prices remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in.. $1.50. per ton at mine. Pittsburgh district.

BUFFALO

Some report of improvement here and there, but it is not general. Anthracite at full mid-summer quiet. Mines all running on part time.

Bituminous—A few of the local shippers claim to see better things in the trade, but as a rule there is no improvement. Slack has been hard to dispose of, but some shippers now report that they have sold all their surplus. It is also stated that some of the larger producers of slack are stocking considerable rather than sell it at present prices.

In spite of the uniformly slow movement of bituminous there are some who are preparing for a stir. There are a few mine owners and representatives who are able to keep their mines running practically all the time and sell their coal at good prices, but the rule is about three or four days' operation a week, and more or less difficulty in disposing of even this reduced output. The buyers are in the market only on solicitation. Bituminous prices are quite as steady as the amount of coal moving will warrant, being based on $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley 15c. to 25c. lower.

Anthracite—The trade is quiet, with no stir expected till after the midsummer lull is over. There is no real complaint, as in bituminous, for what is not sold now will have to be taken later. The actual consumption has not fallen off and is not likely to diminish so long as the supply lasts. Mining is slowing down, on account of the general lack of demand.

The Lake trade keeps up remarkably well, in view of the general notion that the Upper-Lake docks are largely overloaded. The coal does not move out very fast, but it is expected to as soon as the fall crops begin to come in. The Buffalo shipment by Lake for the week was 168,000 tons, which is a decidedly large amount.

TORONTO

Plentiful supplies available and prices showing a softening tendency.

Trade shows little change for the better, manufacturing requirements being much below normal, with a downward tendency in wholesale prices for steam coal. The yards are well suplied, there being a larger quantity of bituminous than usual on the market, owing to the fact that but little is going up the Lakes, vessels being unable to get return cargoes of ore. Buyers as a rule are only purchasing for immediate requirements. Prices are as follows: Retail, anthracite egg, stove and nut, $7.50; grate, $7.25; pea, $6.25. Bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump, $3.68; screenings, $2.64.

TOLEDO

Market dull and prices unchanged. Indications of improved industrial conditions creates hopes of a better market shortly.

The Toledo market is still quiet and prices remain the same. It is believed that Lake shipping will show improvement as soon as business picks up a little, which seems probable according to present indications. Many of the smaller factories have been closed for summer repairs and inventories, and will be reopened within a short time.

The new Hocking Valley docks here have been formally opened and a number of boats loaded and sent up the Lakes with coal. The Hocking Valley has transferred one crew from its old west side docks to its new plant. On July 1 the old dock machinery and trackage rights of the Hocking Valley on the west side will be turned over to the Pennsylvania, after which the Hocking Valley will maintain night and day crews at its new docks.

COLUMBUS

Steam coals in fairly good demand and at slightly better prices. Domestic dull though showing indications of improvement.

Demand for steam grades is holding up well despite the general business depression which cuts into the tonnage required for factories. West Virginia and Kentucky coal is finding its way into Ohio to fill this demand. Prices which were extremely low several weeks ago are more steady and higher. Railroads are also in the market for fuel and have confiscated coal cargoes found on their lines.

There is also a little better demand for domestic grades but so far dealers have been able to take care of this business without inconvenience. Pocahontas and West Virginia splints are in good demand and the same is true of anthracite. Prices on domestic coals are rather firm and ruling unchanged at the levels which have prevailed for several weeks.

The Lake Trade is as active as could be expected with Ohio mines closed. The Hocking Valley docks at Toledo have handled 680,000 tons since the opening of navigation.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.50@$1.40		$1.50@$1.40	$1.50@$1.40
¾-inch	1.35@ 1.30	$1.20@$1.15	1.35@ 1.30	1.30@ 1.25
Nut	1.30@ 1.25		1.25@ 1.20	1.25@ 1.20
Mine-run	1.15@ 1.10	1.10@ 1.05	1.15@ 1.10	1.10@ 1.05
Nut, pea and slack	0.85@ 0.80		0.85@ 0.80	0.80@ 0.75
Coarse slack	0.75@ 0.70	0.85@ 0.80	0.75@ 0.70	0.70@ 0.65

CLEVELAND

Sharp competition between West Virginia and Pennsylvania operators for the Ohio trade. Labor situation still indeterminate. Lake trade continues slightly below normal.

Prices for slack show some signs of advancing and a better demand is being had from all quarters. The improvement is so slight that it is not a real feature, but it is indicative of the future. Fairmount coal has practically been driven out of the market by Youghiogheny and other Pennsylvania fuels that are being sold at remarkably low prices, which the West Virginia operators are refusing to meet. Very little coal is coming in on consignment, as the market is too weak for that.

Pocahontas operators are quoting lump and egg at $2.25 a ton at the mines. A few odd cars were on the market at $2.10, but were not being generally offered, as the broker is not in any hurry to sell. The market for Pocahontas slack is so slow that they are not making the prepared sizes. An odd car of splint was on the market and a few other domestic coals are to be found, but not enough to make them features of the situation.

Hard coal is moving in the usual summer quantities and dealers are having no difficulty getting what they need.

Interest in the coal strike has been centered on southern Ohio and Hocking negotiations, which so far have not been successful. Eastern Ohio operators are prepared to reopen negotiations with the miners through a single representative, who will meet a single representative of the miners. They are anxious to reopen the mines, as the demand for their product is such they fear to lose part of their trade. No effort will be made to meet the miners until Hocking operators have concluded negotiations one way or the other.

The Lake situation is very easy so far as the coal shipper is concerned. Vessels are plentiful, as grain cargoes and cre are so short of the demand the ship-owners want to delay their vessels as much as possible. There are a number of boats operating exclusively in the coal trade, and the result is the coal shippers have more vessels offered them than they have cargoes to load.

For shipment the following prices are being asked:

	Pocahontas	Youghiogheny	Fairmount
Lump	$3.60		
Lump, 1¼-in.		$2.35	
Lump, ¾-in.		2.25	$2.00
Mine run	2.60	2.10	1.90
Egg	3.60		
Nut		2.20	
Slack	2.20@2.35	1.60@1.65	1.65@1.70

CINCINNATI

Resumption of operations in the Kanawha fields and slowing down in Lake shipping are depressing the trade. Surplus tonnages again accumulating. Market completely devoid of interest.

Probably the slowest market of the season has prevailed during the past week, which, considering the previous slump, might well be expected to produce a bad effect. The cessation of operations in the Kanawha field had a slightly favorable effect upon the market for a time, and this, coupled with a reported improvement in the Lake trade, made things temporarily better. But with the resumption of work at the Kanawha mines, fresh supplies of surplus fuel have been thrown upon the market. Both dealers and operators declare that the domestic movement is slower than ever before at this season.

Reports indicate renewed difficulty in keeping the Lake movement up to anything like a normal volume, boats refusing to carry coal up when they must come back light. As the result of this accumulation of adverse conditions the trade in this vicinity is facing an almost unprecedented slump just now; and while the general opinion, based on the necessary consumption of an ordinary year, is that a serious shortage later is inevitable, this does not seem to have any effect at the present time.

DETROIT

Trade holding its own and a more hopeful feeling prevails.

Operators are taking a more hopeful view of the situation; the trade is at least holding its own, and is generally considered as good as could be expected in view of the adverse conditions prevailing. The freight-rate increase asked for by the railroads continues to be the main controlling feature in the present situation. There are also other matters pending in railroad circles that are of vital interest to the coal industry, such as the spotting rules.

SOUTHERN

LOUISVILLE

New July circular has gone into effect and the market is notably firmer. Steam demand from the South is particularly good.

The first of July saw a general advance of about 10c. a ton on Kentucky domestic coals, for which the demand has been improving steadily in the last few weeks. This advance applied especially to the eastern Kentucky field, which has been booking orders in quantities for July, August and September delivery for some time. In parts of the Eastern and Western fields, however, the advance was not made generally effective.

Perhaps one of the most significant things about the market is that the industrial requirements to the South seem more insistent than from sections north of the Ohio River. The Southern demand has disposed of what was getting to be a large accumulation of steam coals; in fact, some of the mines, with effective selling organizations, have now had to instruct their Southern agents to go slow in accepting orders, as they seem to be booked ahead for heavy tonnages.

Such price changes as have been made in the last few days were discounted by the rate at which orders were booked for later delivery. It may be noted that the fancier grades of Southeastern Kentucky block coals are bringing from $1.75 to $1.90, f.o.b. mines, while the Harlan and Straight Creek grades are going at from $1.50 to $1.75. Otherwise the market is unchanged.

MIDDLE WESTERN

INDIANAPOLIS

A gradual improvement expected, due to the big wheat crop. Conditions generally unchanged yet, as to running schedule and prices. It is believed the railroads will be able to handle the heavy fall business satisfactorily.

The wheat is moving and the coal trade takes on a more cheerful tone. In spite of adverse conditions, the marketing of the large crop is bound to help toward a general improvement. There are contracts still hanging back, awaiting the turn of affairs and these will probably be closed at the first indication of improvement. An additional mine here and there in the state is starting up again but the general situation shows no marked improvement. There is more than the normal movement of Eastern coals going into the consumers cellars.

Sometimes there is an advance in Pocahontas at midsummer but not a rise all along the line. The dealers say it is caused by increases at the mines, but operators deny this and seem anxious for more business at old prices. The Indiana mines are said to be in good shape for a heavy run, if future trade conditions demand it. Their average operation now is not much better than half-time. No apprehension is apparent concerning the ability of railroads to handle the coal traffic during the movement of the wheat.

Indianapolis retail dealers have advanced their prices 25c. on both hard and soft coal, following similar advances at the mines. Their new quotations are:

Anthracite, chestnut	$7.75	Pittsburgh lump	$4.00
Anthracite, stove and egg	7.50	Raymond lump	4.00
Anthracite, grate	7.25	Winifred lump	4.00
Pocahontas, forked lump	5.50	Hocking Valley lump	4.00
Pocahontas, shoveled lump	5.00	Luhrig lump	4.00
Pocahontas, mine run	4.00	Luhrig washed egg	4.25
Pocahontas, nut and slack	3.50	Cannel	6.00
Blossburg	5.50	Linton No. 4 lump	3.00
Jackson (Ohio)	4.75	Linton No. 4 egg	3.00
Kanawha lump	4.00	Indiana washed egg	3.25
Kanawha, egg and nut	4.00	Brazil block	4.00
		Connellsville lump	6.00
		Citizens egg coke	5.50
		Citizens nut coke	5.50

CHICAGO

Stronger demand for same grades in the Chicago market and the general tone is improved. The call for Western coal is heavier, buying for near future delivery being more active.

A slight improvement in the steam trade has been reported and the consumption of fine coal is in excess of production. There is a better demand for mine-run and steam

lump which is construed as an indication that there probably will be a revival in business early in July. Anthracite dealers report slack business.

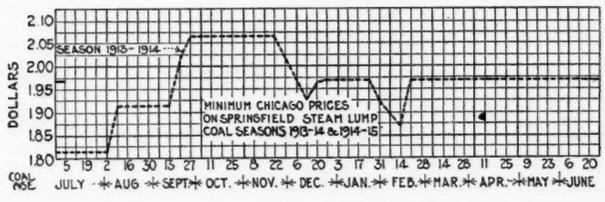
There has been but little change in the smokeless coal market. The larger producers are still adhering to the circular price of $1.25 for mine-run although many sales at $1 a ton have been reported. There is an unusual scarcity of lump and egg. Hocking coal, of course, remains off the market. On account of harvesting requirements Franklin County coal has been in demand among the farmers. All of the larger operators announced an advance from $1.35 to $1.50 for domestic sizes July 1. Springfield coal is being sold almost exclusively to the steam trade, no effort being made to force any domestic on the market. Screenings have been advanced five cents a ton as there has been a scarcity of this fuel.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump	$2.07	$2.30@2.40	$2.12	
Steam lump	1.97		1.97	
Egg		2.30@2.40		$3.95
Mine-run	1.87	2.15@2.25	1.87	3.05@3.30
Screenings	1.62@1.67	1.95	1.62@1.67	

Harrisburg coal is quoted at: Domestic lump and egg, $2.30@2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.95; No. 1 nut, $2.40@2.55; No. 2 nut, $2.30@2.40.

Carterville prices are: Lump, $2.30@2.40; egg, $2.30@2.40 No. 1 washed, $2.40@2.55; No. 2 washed, $2.45.



ST. LOUIS

No demand with the possible exception of some of the steam sizes. Low prices have prevailed over the first have of the current year.

There is no demand for any kind of coal, with the possible exception of a small tonnage of screenings. Right now steam sizes are on the rise, and will possibly be at their high mark until July 8 or 10, when they will start to decline as they did a year ago. It will be remembered that screenings, between July 15 and 25, dropped about 30c. a ton. The circular of a year ago, is identical with the price list of this week, excepting, perhaps, that washed coal is not as strong now as it was then and that the higher grades of coal from Williamson and Franklin Counties are bringing as much as 10c. per ton more this year than last year. This is accounted for largely by the fact that the trade is becoming more discriminating.

The first six months of the calendar year have been anything but profitable ones to the coal trade. Unusually low prices have prevailed, and the greater portion of the period, coal has been selling at cost or less. In Illinois coals there will be nothing doing until about July 6 or 7, when the demand will begin. There is practically nothing moving from that field right now.

Independent and off grade anthracite is selling as much as 50c. below the circular. Smokeless is not coming in, in the volume that it has for the past two or three years, and indications are that its tonnage is diminishing.

The lowest priced coal recently shipped into this market was from West Frankfort, mine-run being quoted as low as 75c., Franklin County. Steam sizes from this point are being sold for less than the cheapest Carterville on the market, which indicates that there is something wrong with the Franklin County field, or at least a portion of it.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	.....	$1.15	$0.80@0.90	$1.15
3-in. lump	.....	.....	.....	.....	.....
6-in. lump	$1.20@1.35	.....	1.25	1.00@1.15	1.35
Lump and egg	1.85@2.15	$2.00	.....	.....	1.15
No. 1 nut	1.20@1.35	.....	.....	.....	.....
Screenings	0.85@0.90	.....	0.80@0.85	0.70@0.80	0.75@0.80
Mine-run	1.00@1.15	.....	.....	0.75@0.80	.....
No. 1 washed nut	1.30@1.40	2.25	1.50	.....	.....
No. 2 washed nut	1.20@1.25	.....	1.35	.....	.....
No. 3 washed nut	1.25@1.30	.....	.....	.....	.....
No. 4 washed nut	1.25@1.30	.....	.....	.....	.....
No. 5 washed nut	0.80@0.85	.....	.....	.....	.....

KANSAS CITY

Threshing demand absorbing considerable coal and the mines are moderately active. Labor scarce and some small strikes reported.

Much improvement has been noted in Kansas City recently, the demand from various sources being stronger. Coal is moving actively to the harvest fields, where threshing is on in full force. Industrial concerns are beginning to order for later delivery, and most of the mines are preparing for extended operations.

Difficulty has been caused by a scarcity of men in some districts. It is reported that some miners have gone to the harvest fields. A number of difficulties between operators and organized labor are reported. In most cases, however, these have been quickly settled and there is little room for concern. The market has been steady, with prospects for an advance in view of the improved conditions.

PORTLAND, ORE.

Nanaimo mines are working again after the settlement of the strike. They are getting out domestic coal but have not yet placed any steam fuel in the market, owing to the fact that considerable development work will have to be done; it is expected to have steam coal on the market within the next two months, however. These mines are operated by the Western Fuel Co. The South Wellington mines are working steadily, and at Comox the Canadian Colliers Co. is busy on its bunker-coal trade. The mines at Ladysmith are also working.

PRODUCTION AND TRANSPORTATION STATISTICS

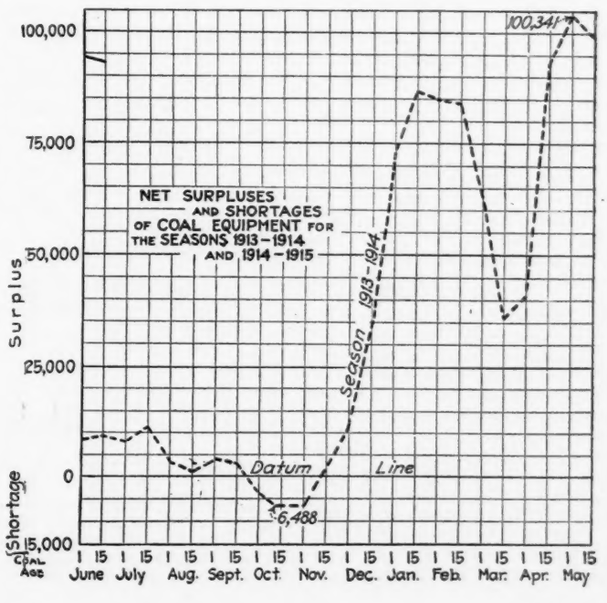
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended June 15, as follows:

	Surplus	Shortage	Net*
New England Lines	1,531	0	**1,531**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	20,854	0	**20,854**
Ohio; Indiana; Michigan; Western Pennsylvania	41,448	0	**41,448**
West Virginia, Virginia, North & South Carolina	5,962	19	**5,943**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	10,120	0	**10,120**
Iowa, Illinois, Wis., Minn.; North & South Dakota	8,347	9	**8,338**
Montana, Wyoming, Nebraska	954	0	**954**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,589	0	**1,589**
Texas, Louisiana, New Mexico	222	20	**202**
Oregon, Idaho, California, Arizona	2,493	1	**2,492**
Canadian Lines	0	0	**0**
Total	93,520	49	**93,471**

	Feb. 15	Mar. 1	Mar. 15	Apr. 1	Apr. 15	May 1	May 15	June 1
Surplus	84,775	64,822	39,133	41,055	92,139	100,370	99,664	94,770
Shortage	239	1,394	3,282	615	24	29	313	7
Net*	**84,536**	**63,428**	**35,851**	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**

***Bold face** type indicates a surplus.



SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for December and the years 1912 and 1913:

State	December		Year	
	1912	1913	1912	1913
Missouri	286,828	266,335	3,018,351	2,924,728
Kansas	511,651	540,872	5,153,543	5,782,194
Arkansas	169,490	138,678	1,852,290	1,943,861
Oklahoma	318,899	324,728	3,037,995	3,534,842
Totals	1,286,868	1,270,613	13,062,179	14,185,625

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for April, 1913-14, and for the ten months ending April, 1912-13-14, in long tons:

	10 Months			April	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	6,091	8,550	10,133	1,099	442
Canada	850,351	1,181,216	882,772	119,805	136,486
Japan	12,935	66,497	83,441	23,840	233
Australia and Tasmania	162,867	129,985	226,945	12,827	29,020
Other countries	1,944	3,257	3,430	.....	.....
Total	1,034,188	1,389,505	1,206,721	157,571	166,181
Exports:					
Anthracite					
Canada	2,607,860	3,635,117	3,000,205	310,938	392,822
Uruguay	.....	.....	84	.....	.....
Other countries	51,254	66,324	50,077	7,377	3,438
Total	2,659,114	3,701,441	3,050,366	318,315	396,260
Bituminous,					
Canada	8,565,064	9,092,740	9,972,979	797,126	395,627
Panama	389,643	393,449	314,467	53,190	33,073
Mexico	266,536	350,201	259,575	85,664	24,453
Cuba	918,747	1,035,110	965,528	119,221	63,091
West Indies	577,545	502,891	481,284	46,878	56,213
Argentina	.....	.....	118,354	.....	18,966
Brazil	.....	.....	212,668	.....	15,831
Uruguay	.....	.....	44,671	.....	4,179
Other countries	1,145,609	911,299	1,066,061	169,702	160,604
Total	11,863,144	12,285,690	13,435,587	1,271,781	772,037
Bunker coal	5,832,031	5,976,266	6,449,722	599,195	695,192

NORFOLK & WESTERN RY.

Destination of shipments over this road for May and the first five months of this year and last year were as follows, in short tons:

	May		Five Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	165,695	144,560	700,906	761,745
Tidewater, coastwise	340,073	336,958	1,640,744	1,652,101
Domestic	1,625,977	1,857,154	7,027,891	7,786,519
Coke				
Tidewater, foreign	5,857	.....	22,841	15
Domestic	132,391	88,145	693,860	491,732
Total	2,269,993	2,426,817	10,086,242	10,692,112

COAL FREIGHT DECISIONS

I. C. C. No. 5822—Hammerschmidt & Frazen Co. vs. Chicago & North Western Ry.

Proviso, Ill., a terminal of the Chicago & North Western Ry., within, but on the extreme outer edge of, the Chicago switching district, is an interchange point at which the North Western receives coal from the Indiana Harbor Belt Railroad moving in course of through transportation from points east of the Indiana-Illinois state line to Elmhurst, Ill., a point beyond the Chicago switching district, three miles west of Proviso on the North Western. Upon complaint alleging that the rates from Chicago to Elmhurst are unreasonable and unduly prejudicial, when applied as proportional rates from Proviso to Elmhurst, **Held:**

1. That the relative situation of Elmhurst and Proviso is not different in principle from that presented where competitive points are in close proximity to one another but in groups from or to which different group rates apply.

2. That while carriers may establish common rates to a defined zone or group of points and treat them all as a unit for rate-basing purposes, they do so subject to the inhibitions of the law against creating undue prejudice to points just without or beyond that zone.

3. The traffic here involved is through traffic, and the reasonableness of rates applicable thereto must be considered in respect to the reasonableness of the through rates in their entirety. So considered, the through rates to Elmhurst are not shown to be unreasonable in themselves, but they are found to be unduly prejudicial against Elmhurst and unduly preferential to Chicago and Proviso.

FOREIGN MARKETS

GREAT BRITAIN

June 19—Business is somewhat restricted owing to the strike of Marine engineers. Loading operations have so far been unchecked, but unless a quick settlement takes place the holding up of vessels will reduce shipments and cause pit stoppages.

Prices are quotable as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08@4.14
Best seconds	4.68@4.80	Seconds	3.84@3.90
Seconds	4.44@4.56	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.50	Seconds	2.46@2.52

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.24; good foundry, $4.80@5.52; furnace, $4.08@4.56.

British Exports—The following is a comparative statement of British exports for May and the five months of the last three years, in long tons:

	May		5 Months		
	1913	1914	1912	1913	1914
Anthracite	251,117	253,865	784,220	1,188,283	1,154,556
Steam	4,318,911	4,432,243	14,791,968	21,636,454	20,982,745
Gas	929,955	1,096,487	3,326,247	4,523,898	4,746,561
Household	128,856	142,968	485,599	710,583	603,010
Other sorts	301,108	282,773	1,028,645	1,460,607	1,365,846
Total	5,929,947	6,208,331	20,416,769	29,519,825	28,852,718
Coke	71,944	75,082	336,969	424,334	444,446
Manufactured fuel	145,723	186,050	526,634	837,070	852,326
Grand total	6,147,614	6,469,463	21,280,282	30,781,229	30,149,490
Bunker coal	1,618,844	1,840,950		8,366,021	8,500,680

GERMANY

Imports and exports in the German empire for April and the first four months were:

	April		4 Months	
Imports	1913	1914	1914	Change
Coal	940,715	809,690	2,934,902	—183,657
Lignite	650,074	603,636	2,131,097	—251,496
Coke	42,118	45,759	183,790	+1,676
Coal briquettes	1,089	3,270	10,216	+2,896
Lignite briquettes	8,556	7,637	45,035	+786
Exports				
Coal	2,938,850	2,930,875	11,962,216	+560,196
Lignite	3,250	2,982	23,502	+522
Coke	573,667	429,490	1,786,377	—490,042
Coal briquettes	207,788	224,782	789,310	—32,099
Lignite briquettes	51,654	52,178	295,741	—17,885

Production for the same period was:

	April		4 Months	
	1913	1914	1913	1914
Coal	15,821,006	15,162,413	63,379,455	63,144,078
Lignite	7,258,044	7,130,471	28,176,021	29,802,652
Coke	2,668,455	2,576,095	10,660,315	10,667,774
Coal briquettes	501,286	464,995	1,937,511	2,054,020
Lignite briquettes	1,818,192	1,846,679	6,866,452	4,474,060

COAL SECURITIES

Dividends have been announced as follows:

Delaware, Lackawanna & Western Coal—Regular quarterly dividend of 2½%, payable July 15, to holders of record, July 1.

Lehigh Valley Coal Sales—Regular quarterly dividend of 2½%, payable July 10 to holders of record, July 9.

Pittsburgh Coal—Regular quarterly dividend of 1¼% on the preferred, payable July 25 to holders of record, July 15.

Mahoning Coal R.R.—Dividend on the common of $5, payable Aug. 1 to holders of record July 15, and on the preferred of $1.25 payable July 1 to holders of record, June 19.

Reading Co.—Regular quarterly dividend of 2% on the common, payable Aug. 13 to holders of record July 28; regular quarterly on the first preferred of 1%, payable Sept. 10 to holders of record Aug. 25, and regular quarterly on second preferred of 1%, payable July 9, to holders of record, June 27.

St. Louis, Rocky Mountain & Pacific Co.—Regular quarterly of 1¼% on the preferred, payable June 30 to holders of record, June 21 to 29.

Island Creek Coal Co.—Regular quarterly dividend on the common of 50c., together with an extra dividend of $3, both payable Aug. 1 to holders of record, July 15, and the regular quarterly dividend of $1.50 on the preferred, payable July 1 to holders of record June 23.